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 HACVPTDPNPQEIVLEN<sup>V2</sup>VTE<sup>V2</sup>NFNMWKNMVEQM<sup>V2</sup>HEDIISLWDQSLKPCVKLTPLCVTL<sup>V1</sup>NC<sup>V1</sup>TNVRNVSSNG  
TETDNEEIKNCSEFNITTELRDKKQKVYALFYRLDVVPID<sup>V2</sup>DN<sup>V2</sup>SS<sup>V2</sup>ELSGKNS<sup>V2</sup>EYRLINC<sup>V2</sup>NTSAITQACP  
 KVSFEPIPIHYCAPAGFAILKCNDKK<sup>V3</sup>ENG<sup>V3</sup>TG<sup>V3</sup>PC<sup>V3</sup>KN<sup>V3</sup>SV<sup>V3</sup>TVQCTHG<sup>V3</sup>IK<sup>V3</sup>PPVSTQ<sup>V3</sup>LLNGSLAEEEEIIIRSEN  
 ITNNAKTIIVQLNESVEIN<sup>V4</sup>CTRPNN<sup>V4</sup>TRK<sup>V4</sup>SIHIGPGQAFYATGEIIGDIRQAH<sup>V4</sup>CNISR<sup>V4</sup>TKWNKT<sup>V4</sup>LQQVAK  
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 VFAVLSIVNRVRQGYSPLSFQTLIPNPRGPD<sup>V5</sup>REGIEEGEGEQGRDRSIRLVNGFELALAWDDLRSLCLFS  
 YHRLRDFILLAAARTVELLGR<sup>V5</sup>RRSLRG<sup>V5</sup>LQ<sup>V5</sup>KGWEALKYLG<sup>V5</sup>NLLQYWGQELKNSAISLLDTAIAVAEGTDRVI  
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Fig. 1A

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Fig. 1B

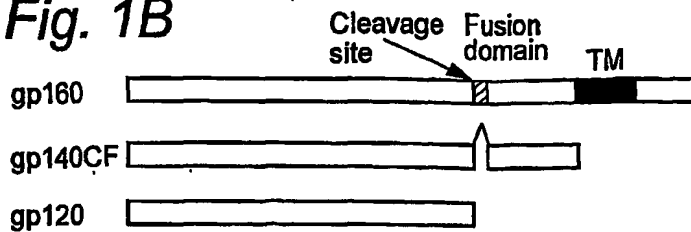


Fig. 1C

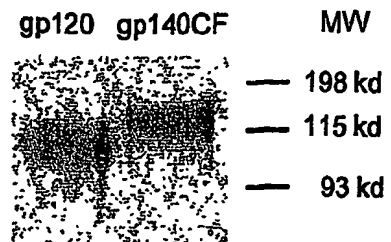


Fig. 1D

CON6.env (group M env consensus. This one contain five variable regions in env gene from 98CN006 virus, not in the public domain yet)

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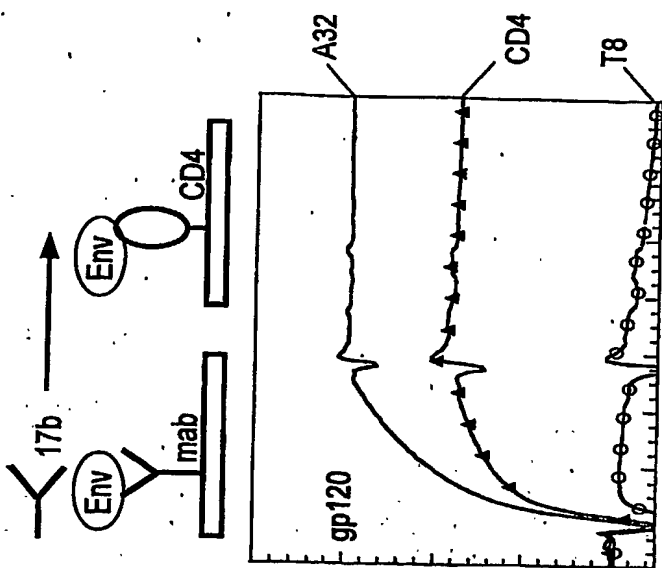


Fig. 2C

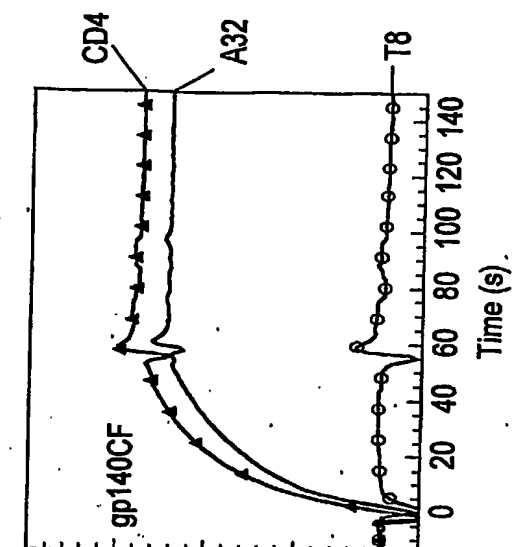


Fig. 2D

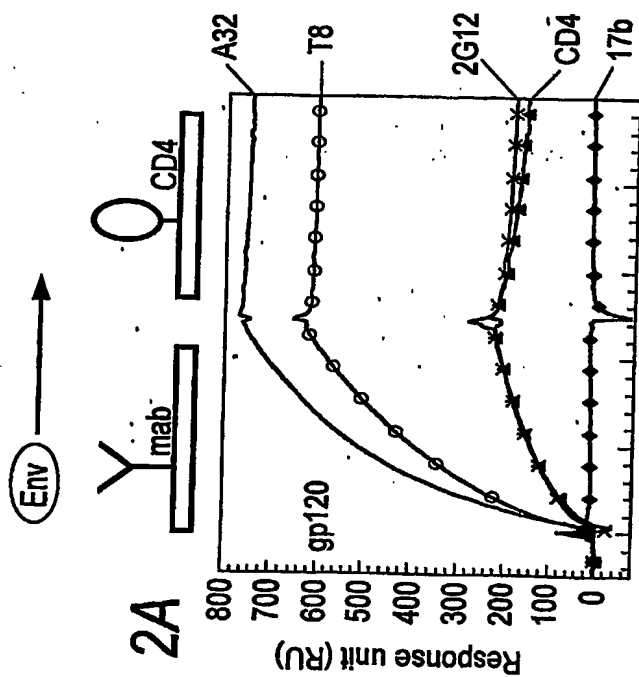


Fig. 2A

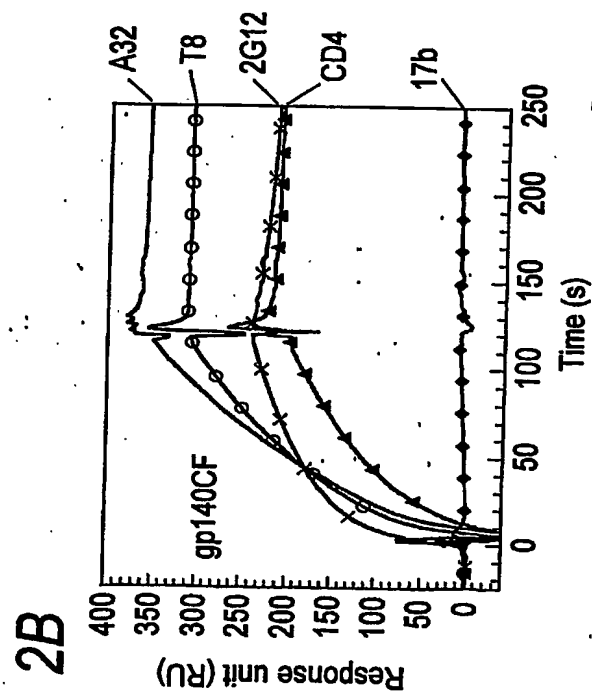


Fig. 2B

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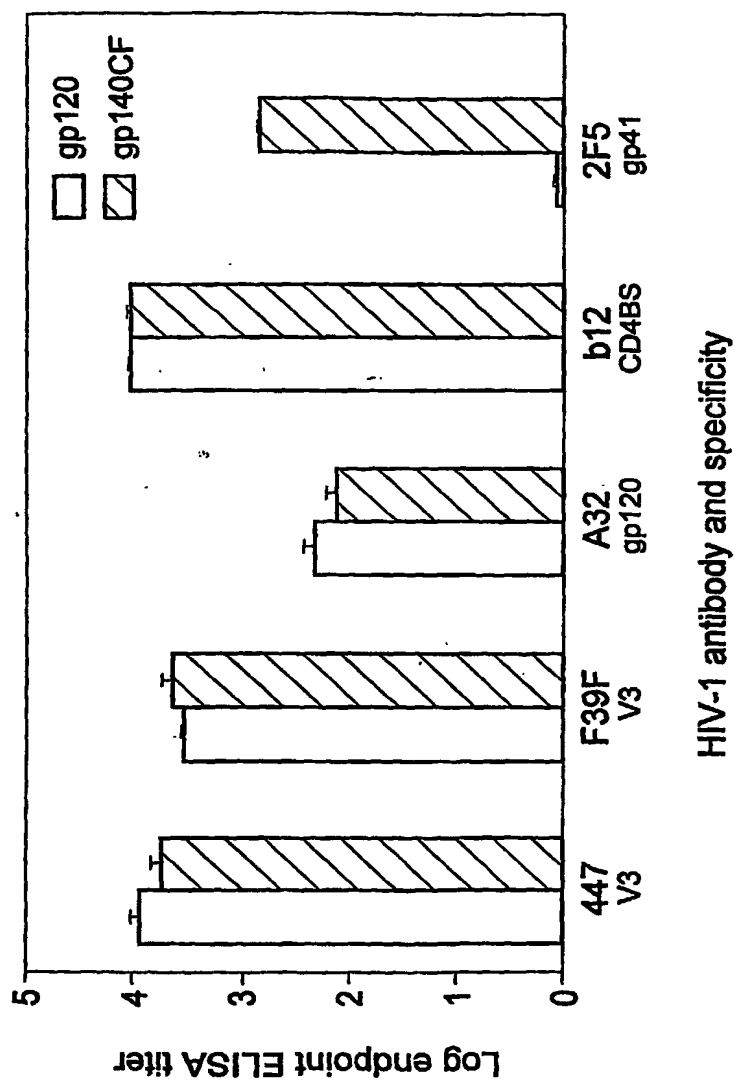
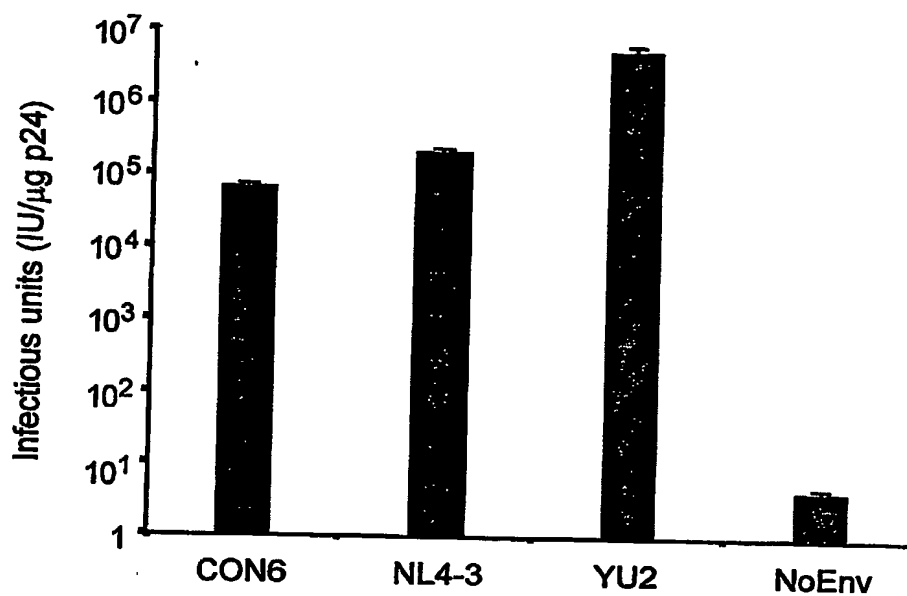
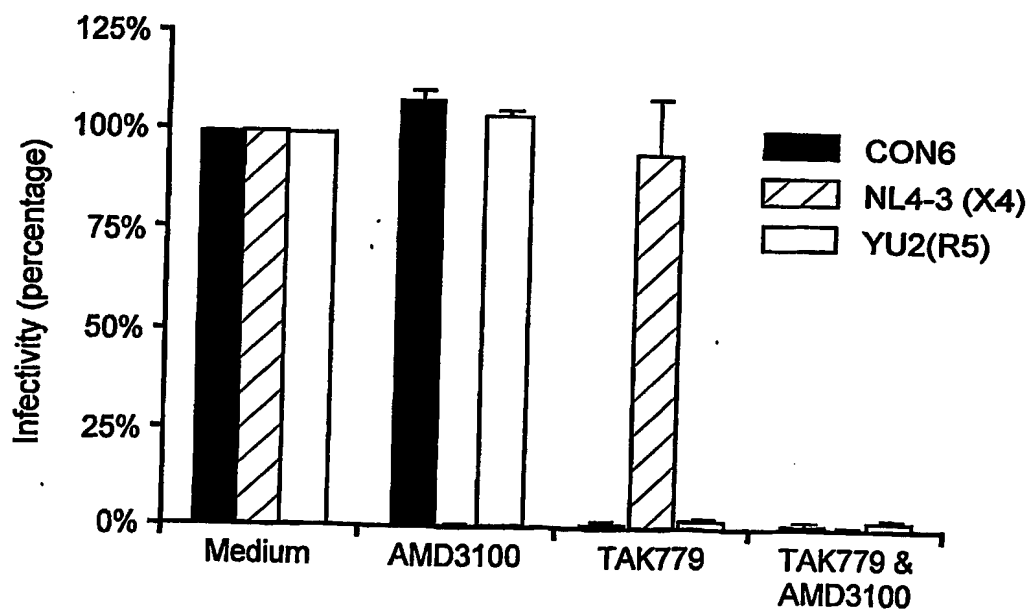


Fig. 2E



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*Fig. 3A**Fig. 3B*

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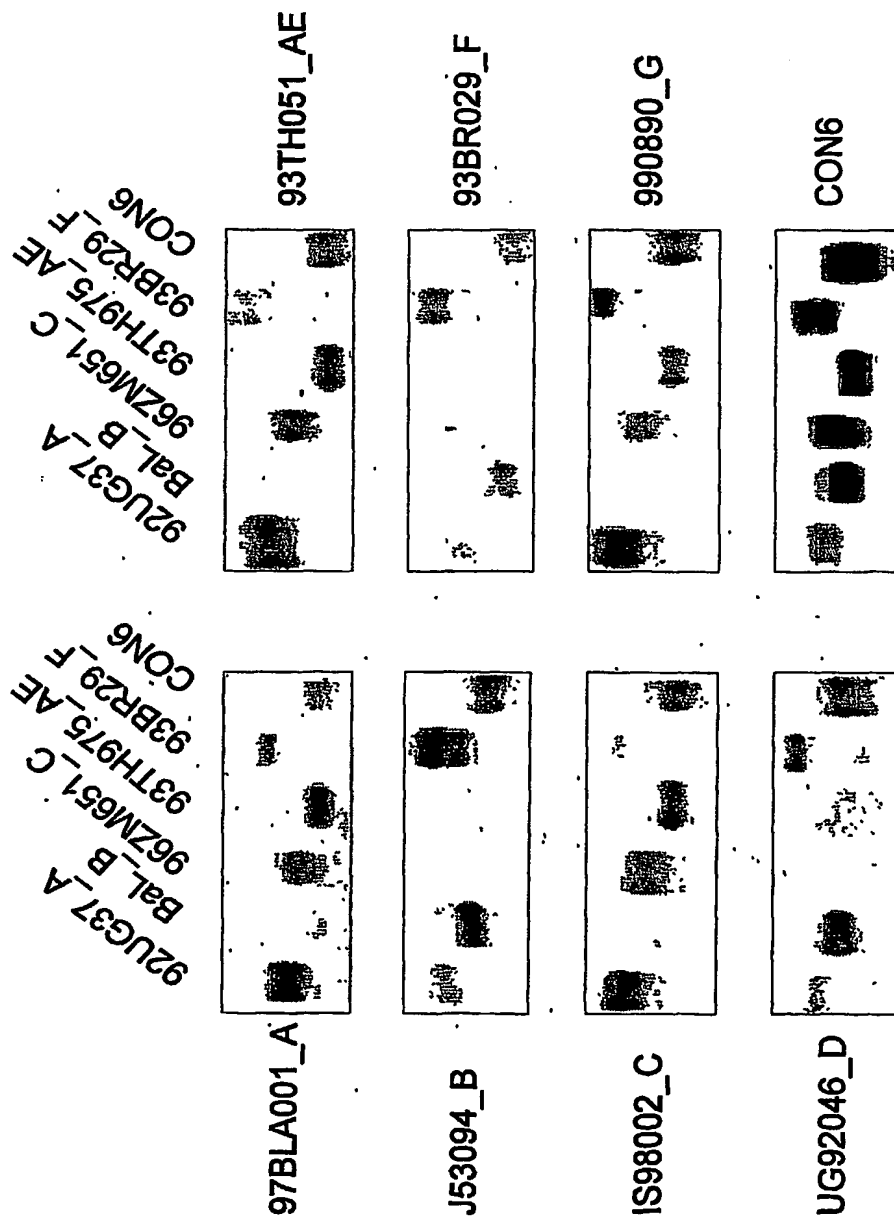
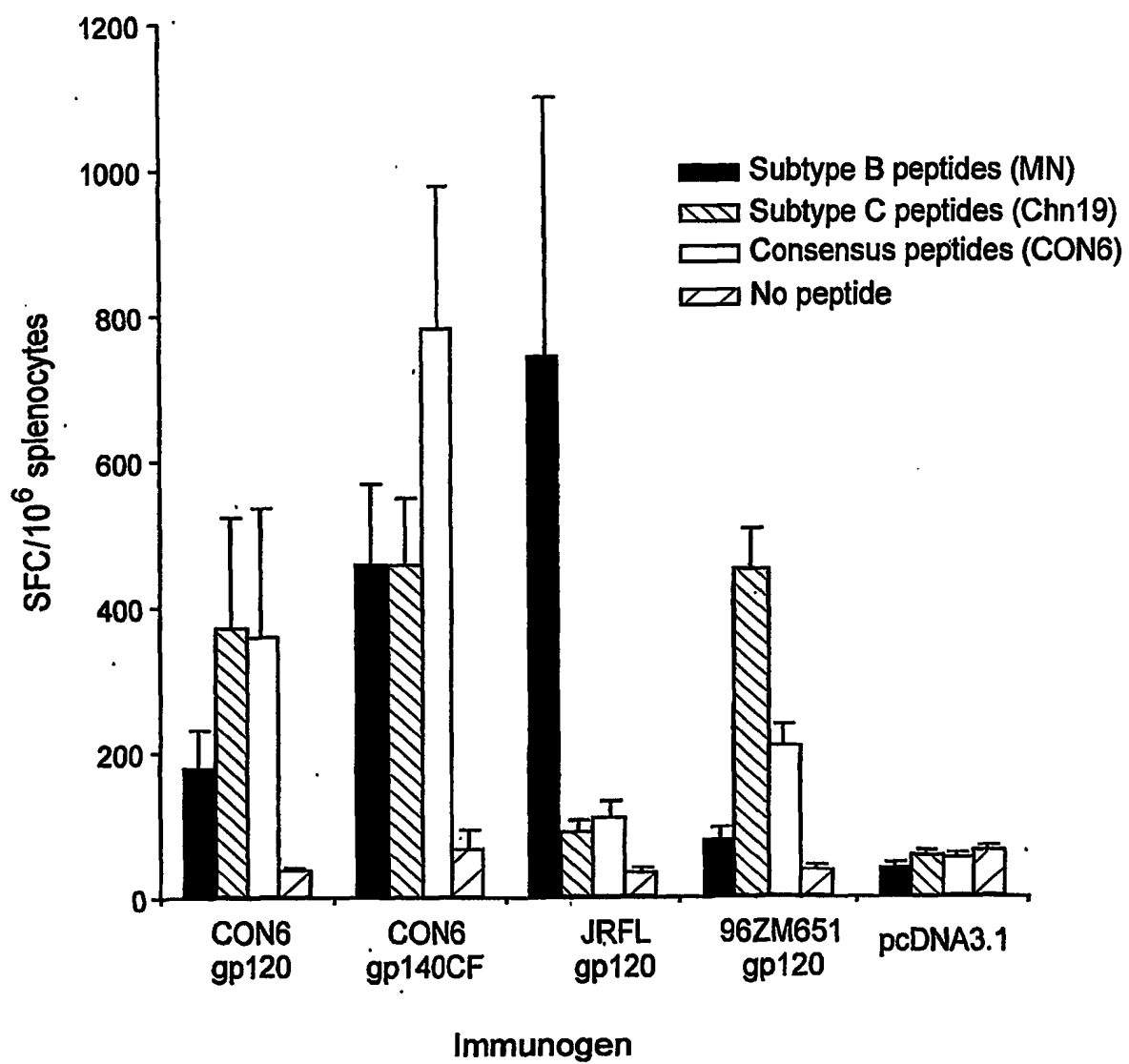


Fig. 4

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*Fig. 5*

**Fig. 6A**

[illegible]

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**Fig. 6B**

C.con.env (subtype C consensus env. The amino acid sequence is different from Los Alamos Database August 2002)

GCCGCCATGCGCGTGATGGGCATCCTGCGCAACTGCCAGCAGTGGTGGAT  
 CTGGGGCATCCTGGGCTTCTGGATGCTGATGATCTGCAACGTGGTGGGCA  
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 ACCACCCTGTTCTGCGCTCCGACGCCAAGGCCTACGAGAAGG AGGTGCA  
 CAACGTGTGGGCCACCCACGCCTGCGTGCCACCGACCCCAACCCCCAGG  
 AGATGGTGCTGGAGAACGTGACCGAGAACTTCAACATGTGGAAGAACGAC  
 ATGGTGGACCAGATGCACGAGGACATCATCTCCCTGTGGGACCAGTCCCT  
 GAAGCCCTGCGTGAAGCTGAACCCCTGTGCGTGACCCTGAACTGCCGCA  
 ACGTGACCAACGCCACCAACAACACCTACAACGAGGAGATCAAG AACTGC  
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 CGAGAACCTGACCAACAACGCCAAGACCATCATCGTGACCTGAACGAGT  
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 CATCCGCCAGGCCCACTGCAACATCTCCGAGGACAAGTGGAAACAAGACCC  
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 CCACCTACAACAACAACACCAACTCCAACCTCACCATCACCTGCC TGC  
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C.anc.env (subtype C ancestral env)

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YNGEMKNCNFNITTELDRDKKKKEYALFYRLDIVPLN ENSSEYRLINCNTSAITQACPKVSFDPPIHYCA  
PAGYAILKCNKTFNGTGPCNNVSTVQCTHGIKPVSTQLLNGSLAESEEIIRSENLTDNAKTIIVQLN  
ESVEIVCTRPNNNTRKSMRIGPGQTFYATGDIIGDIRQAHCNISEDKNKTLQOVAEKLGHFPNKTITF  
EPSSGGDL EITTHSFNCRGEFFYCNSTKLFNSTYNNNTNSNSTITLPCRKQIINNMQGVQAMYPPIA  
GNITCKSNITGLLLTRDGGKENTTETFRPGGDMRDNRSELYKYKVEIKPLGVAPTEAKRRVVEREKR  
AVGLGAVFLGFLGAAGSTMGAASITLTVQARQLLSGIVQQQSNLLRAIEAQQHMLQLTVWGIKQLQARVL  
AMERYLKDQQLLGIWGC SGKLICTTAVPWNSSWSNKSLLDDIWDNMTWMEWDREISNYTDTIYRLLEESQN  
QOEKNEQDLLALDSWENLWNVFDITNWLWYIKIFIMIVGGLIGLRIIFAVL SIVNVRQGYSPLSFQTLT  
PNPRGPDRLRIIEEGEGEQDRDRSIRLVSGFLALAWDDLRSCLFSYHRLRDFILIAARTVELLGRSSLR  
GLQRGWEALKYLGSLVQYWGQELKKS AISLLDTIAIAVAEGTDRIIEVVQACRAILNIPRRIRQGFEEA  
LL

Fig. 6C

C.con.env (subtype C consensus env)

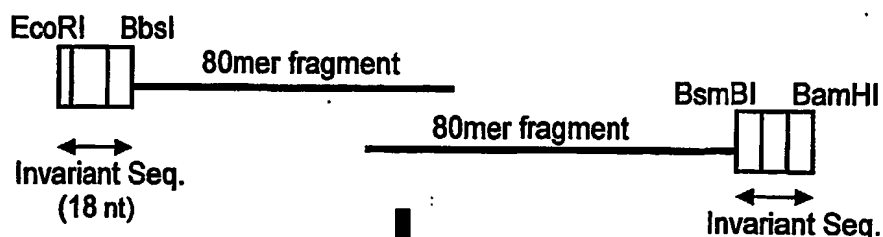
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YNEEIKNCNFNITTELDRDKKKVYALFYRLDIVPLNENSSSEYRLINCNTSAITQACPKVSFDPPIHYCA  
PAGYAILKCNKTFNGTGPCNNVSTVQCTHGIKPVSTQLLNGSLAESEEIIRSENLTDNAKTIIVHLN  
ESVEIVCTRPNNNTRKSIRIGPGQTFYATGDIIGDIRQAHCNISEDKNKTLQORVSKLKEHFPNKTIKF  
EPSSGGDL EITTHSFNCRGEFFYCNSTKLFNSTYNNNTNSNSTITLPCRKQIINNMQEVGRAMYAPPIA  
GNITCKSNITGLLLTRDGGKNTTEIFRPGGDMRDNRSELYKYKVEIKPLGVAPTEAKRRVVEREKR  
AVGIGAVFLGFLGAAGSTMGAASITLTVQARQLLSGIVQQQSNLLRAIEAQQHMLQLTVWGI KQLQTRVL  
AIERYLKDQQLLGIWGC SGKLICTTAVPWNSSWSNKSQEDIDWNMTWQWDREISNYTDTIYRLLEDSQN  
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PNPRGPDRLRIIEEGEGEQDRDRSIRLVSGFLALAWDDLRSCLFSYHRLRDFILVAARAVELIIGRSSLR  
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LQ

Fig. 6D

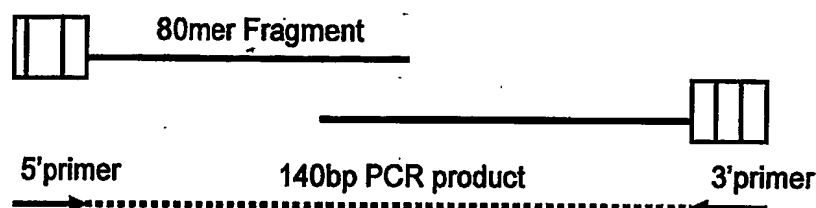
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**Fig. 6E**

Synthesize entire gene in 80-mer fragments overlapping by 20 residues at the 3' end with invariant sequences at the 5' end.

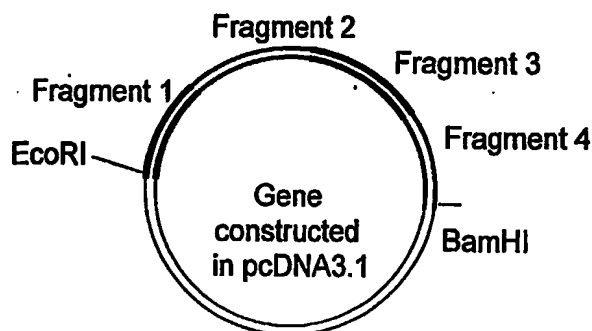


Paired 80mer oligos are connected via PCR in a stepwise manner from 5' to 3' using primers complimentary to the invariant seq.



108bp PCR fragments cloned into pGEM-T and sequenced. Clones with the proper sequence will be cut with 2 restriction enzymes. 4 fragments will be ligated together with pcDNA3.1 in a stepwise manner from the 5' to 3' end of gene

Fragments to be ligated with pcDNA3.1 (1-4 are in order from 5' to 3')	Restriction Enzymes Used to Cleave Fragment
Fragment 1	EcoRI/BsmBI
Fragment 2	BbsI/BsmBI
Fragment 3	BbsI/BsmBI
Fragment 4	BbsI/BamHI
pcDNA3.1	EcoRI/BamHI



Ligations will be repeated stepwise 5' to 3' until the entire gene has been cloned into pcDNA3.1

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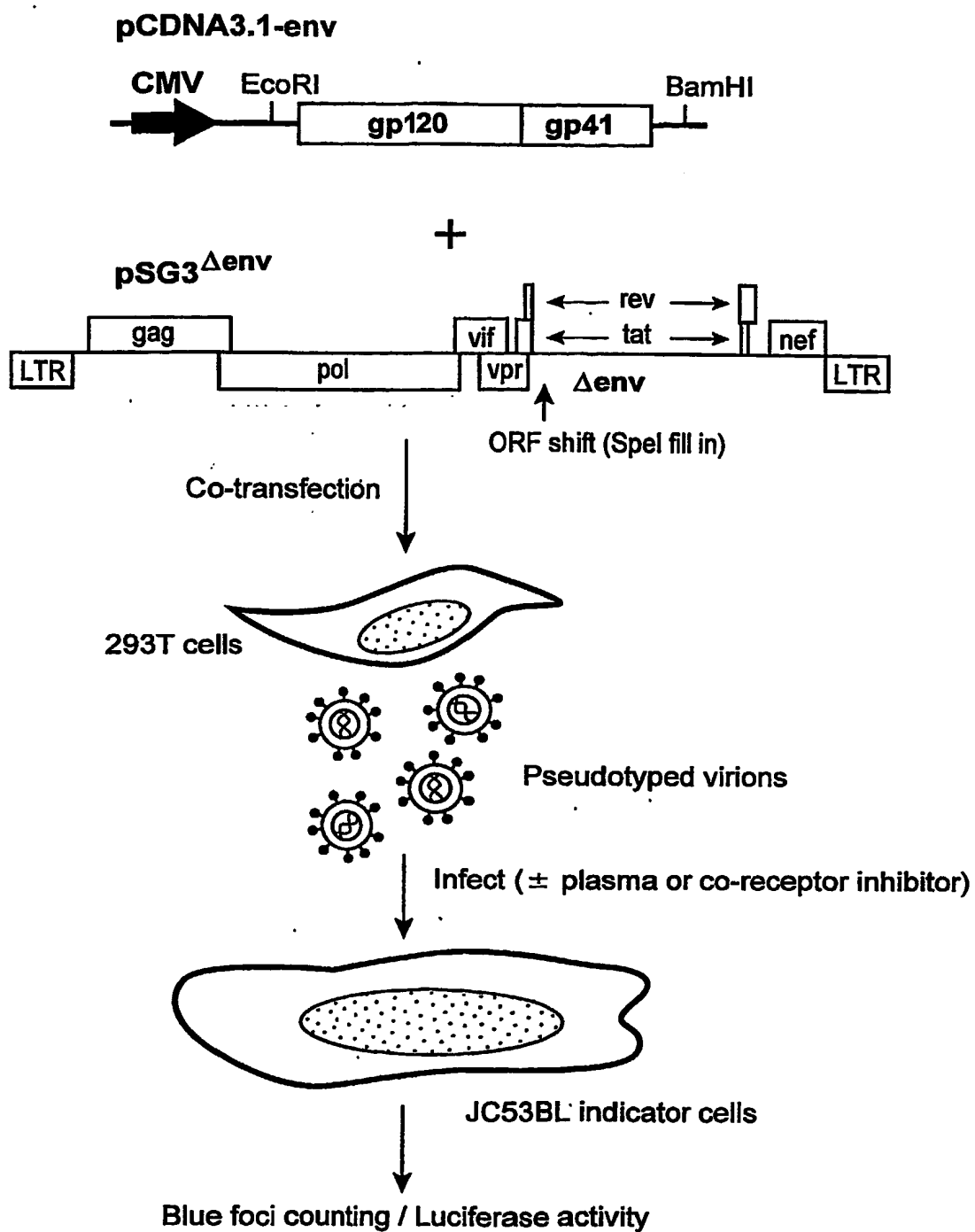
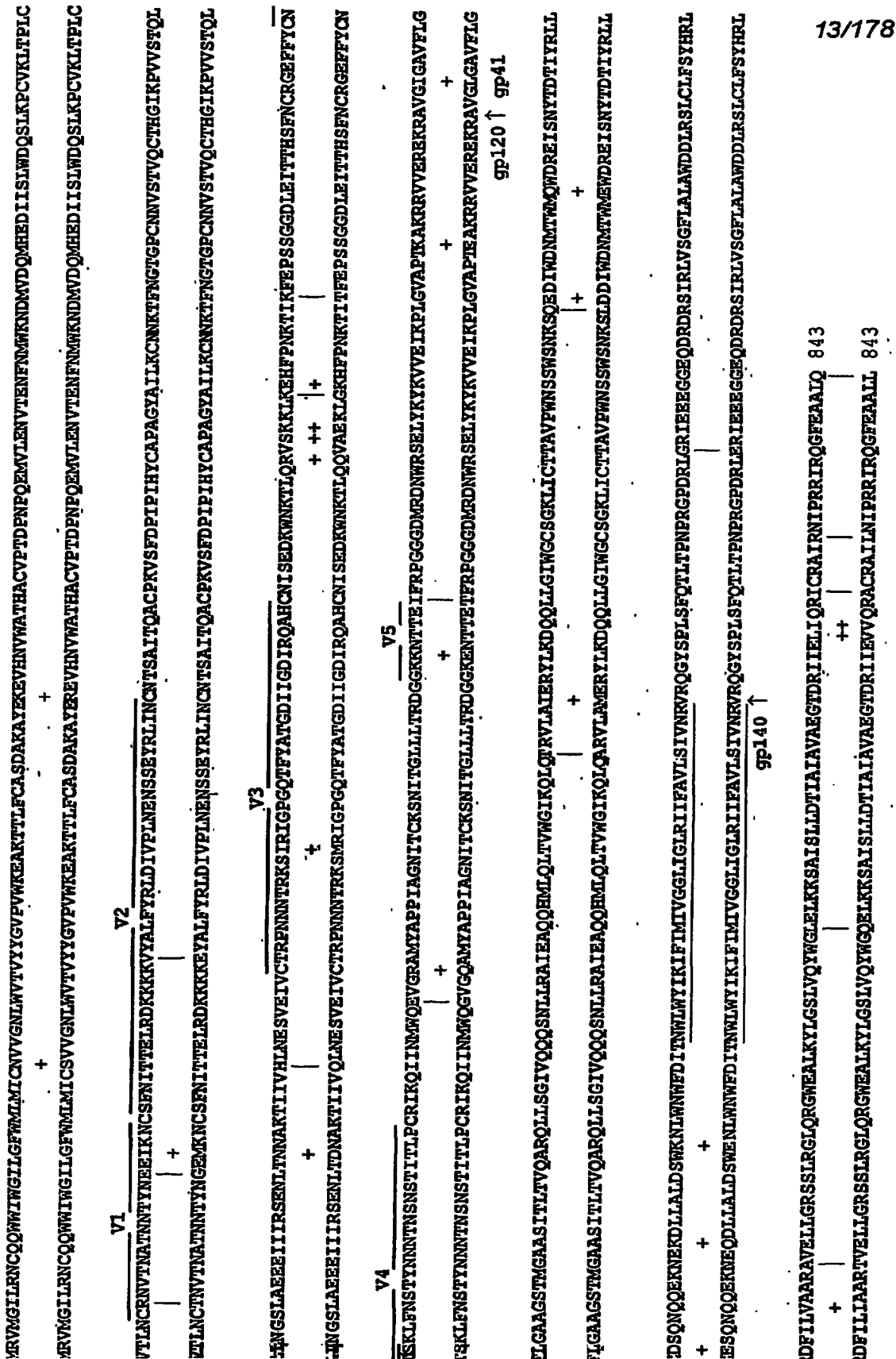
*Fig. 7*



Fig. 8



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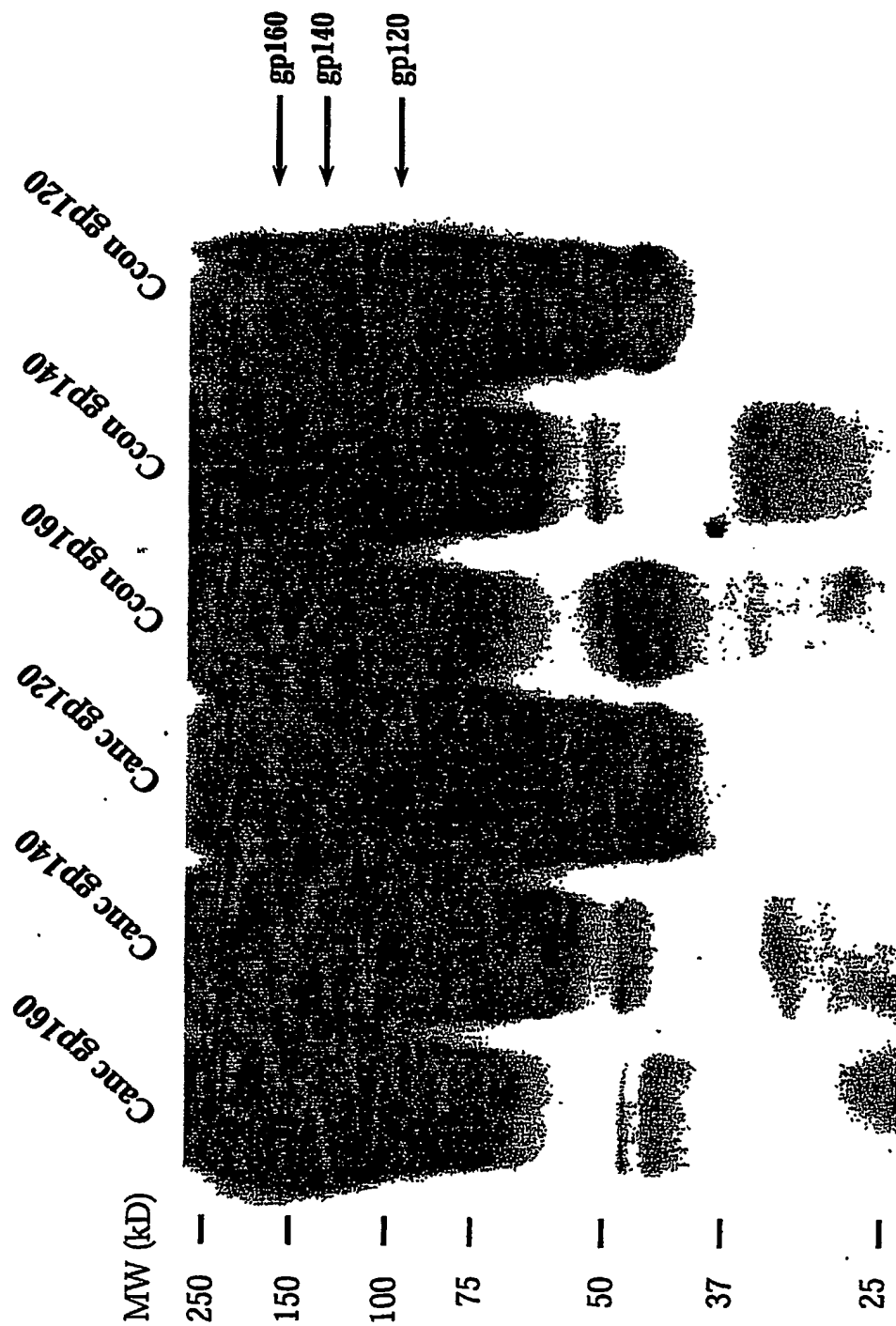
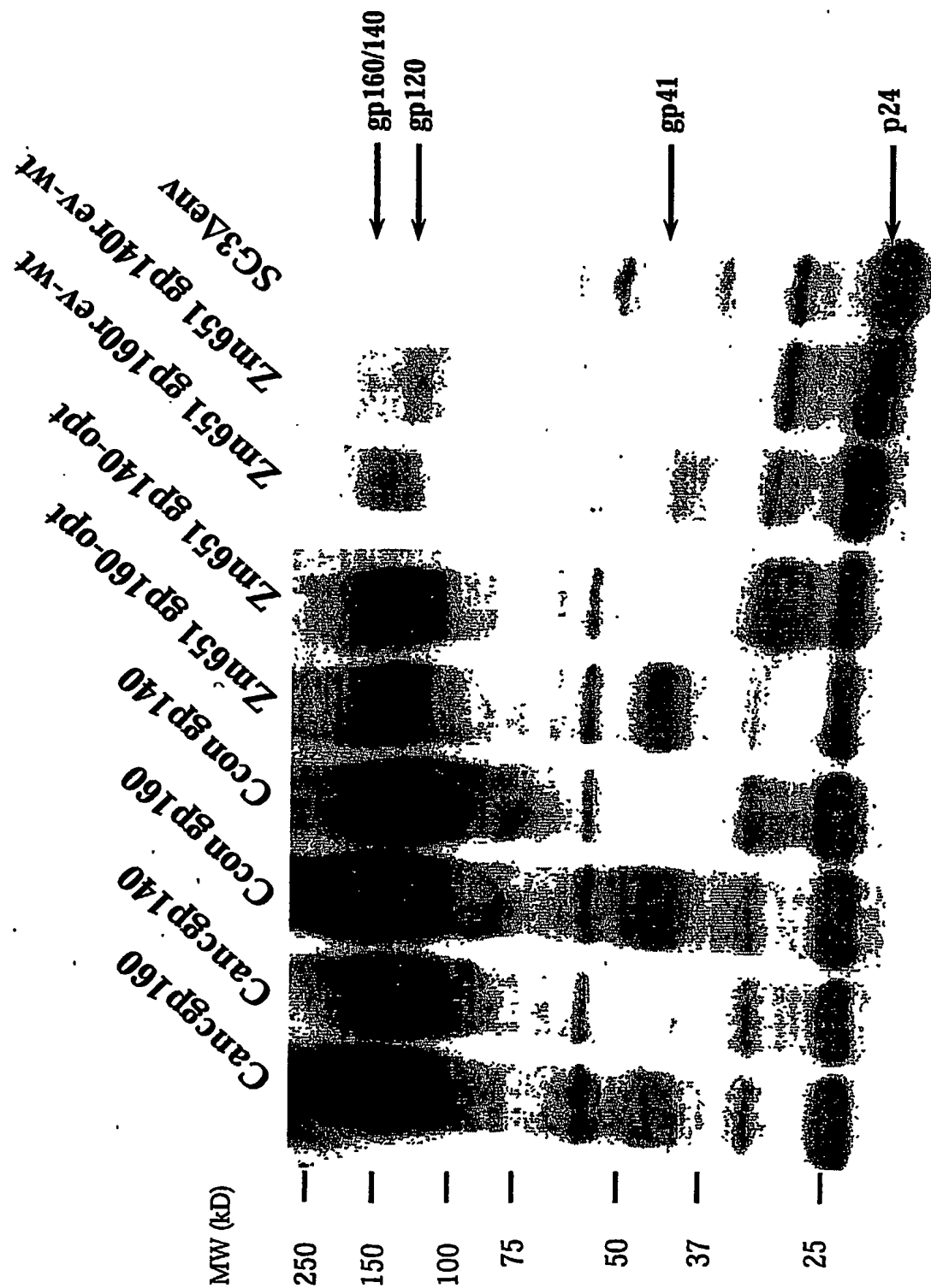


Fig. 9

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Fig. 10A



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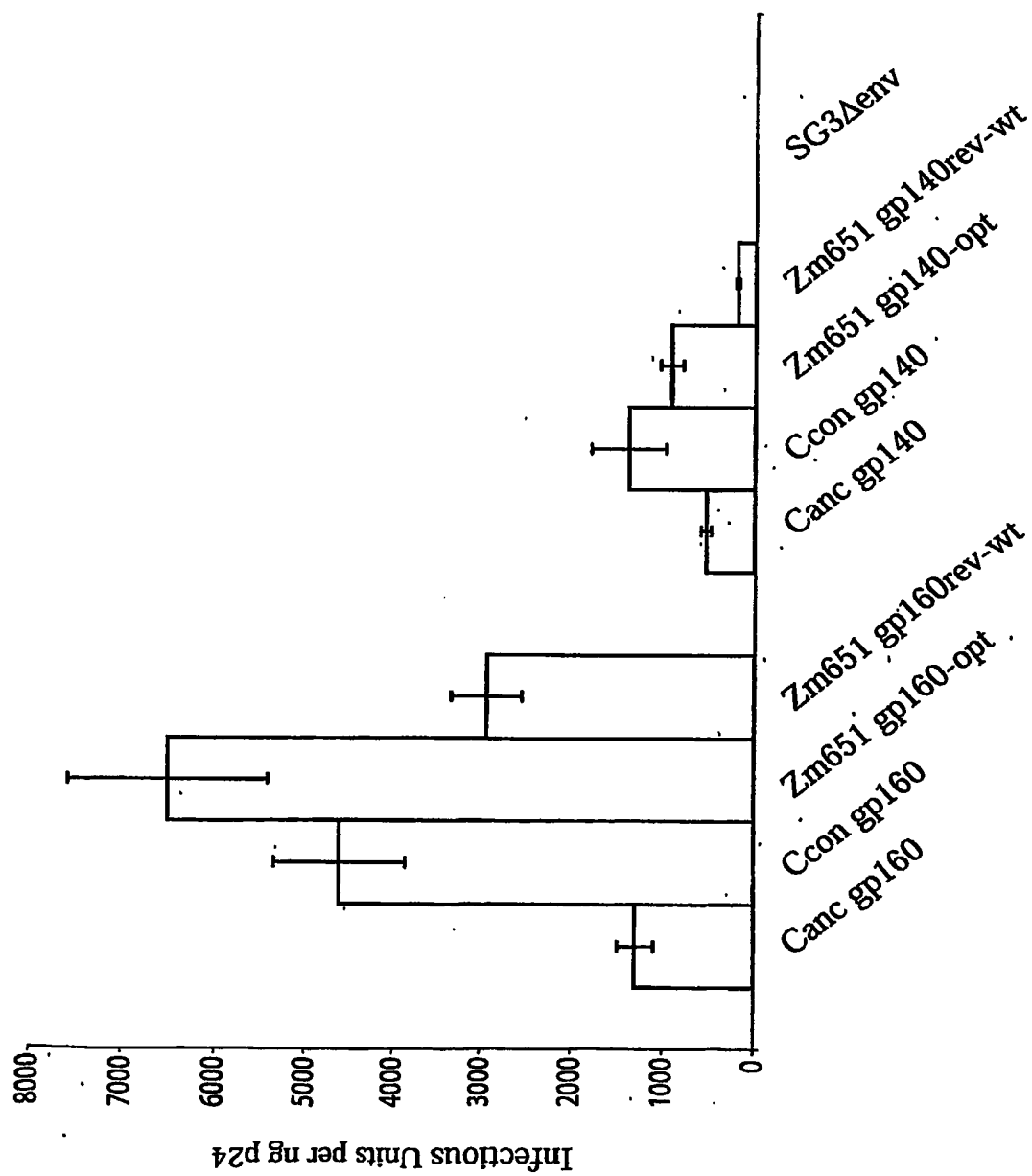
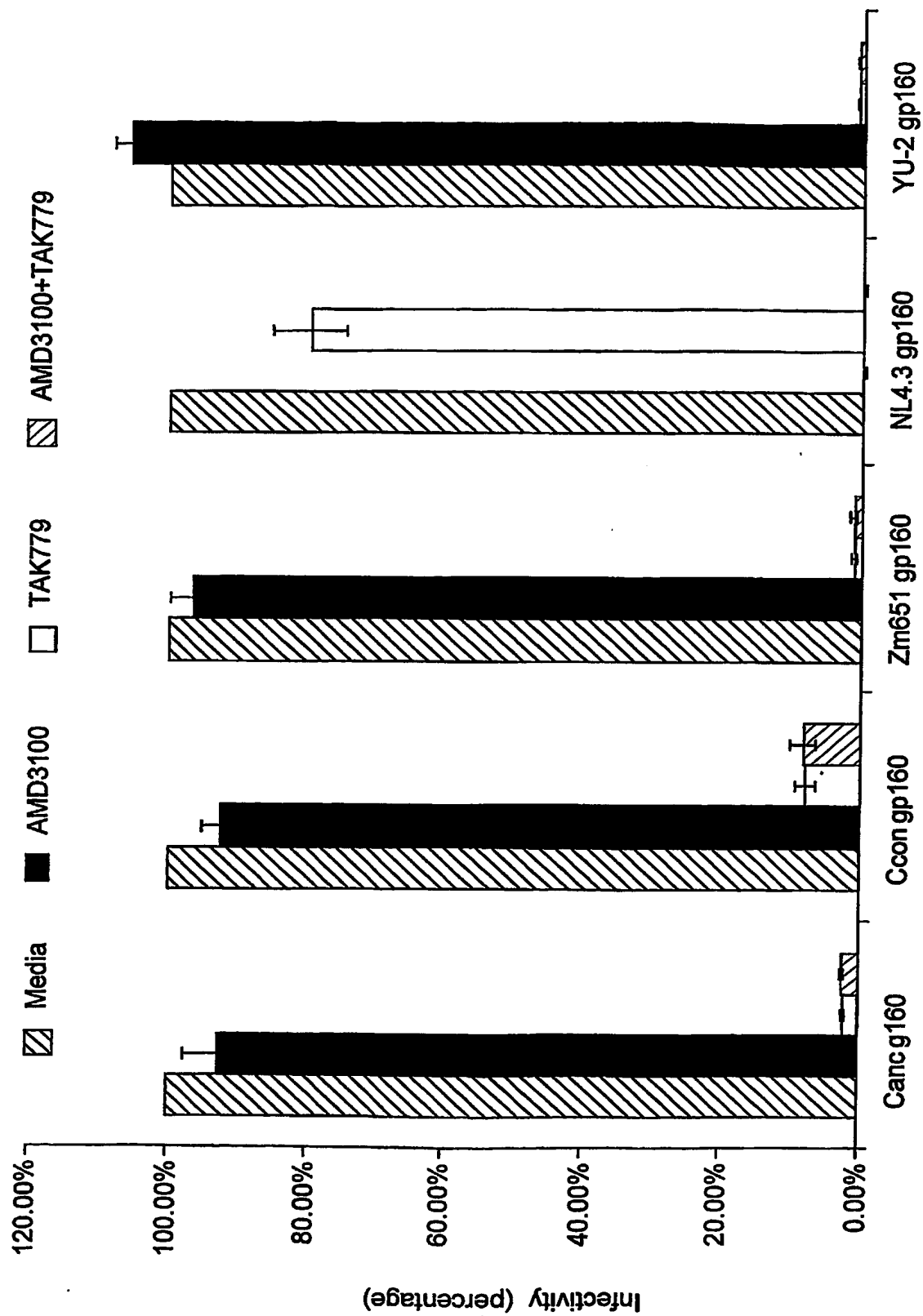


Fig. 10B

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Fig. 11



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Fig. 12A

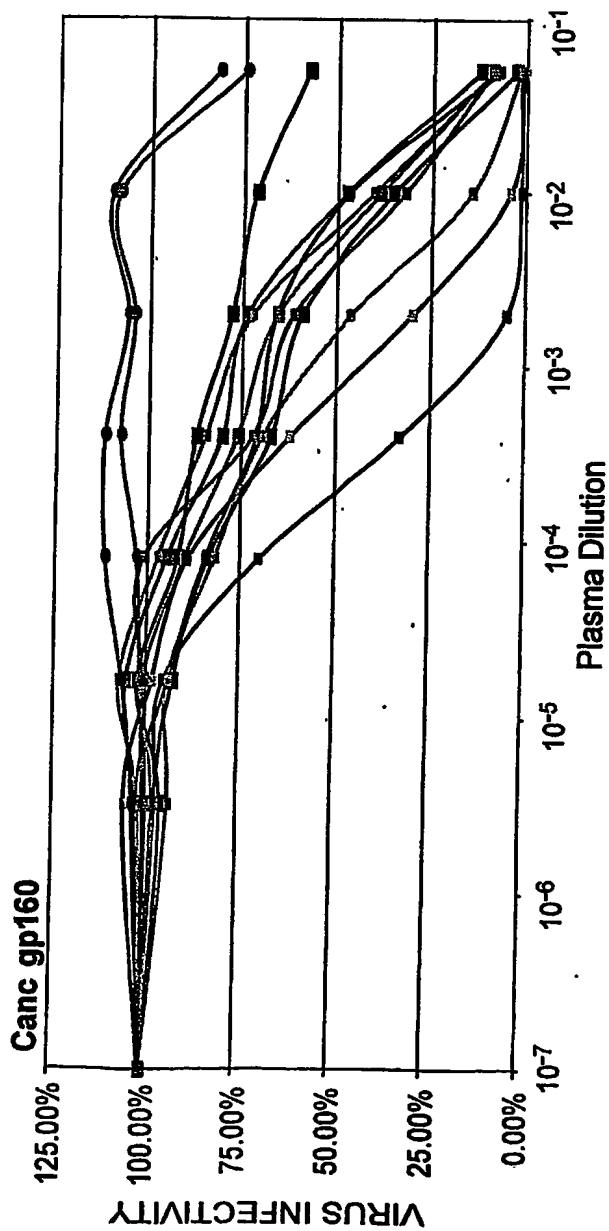
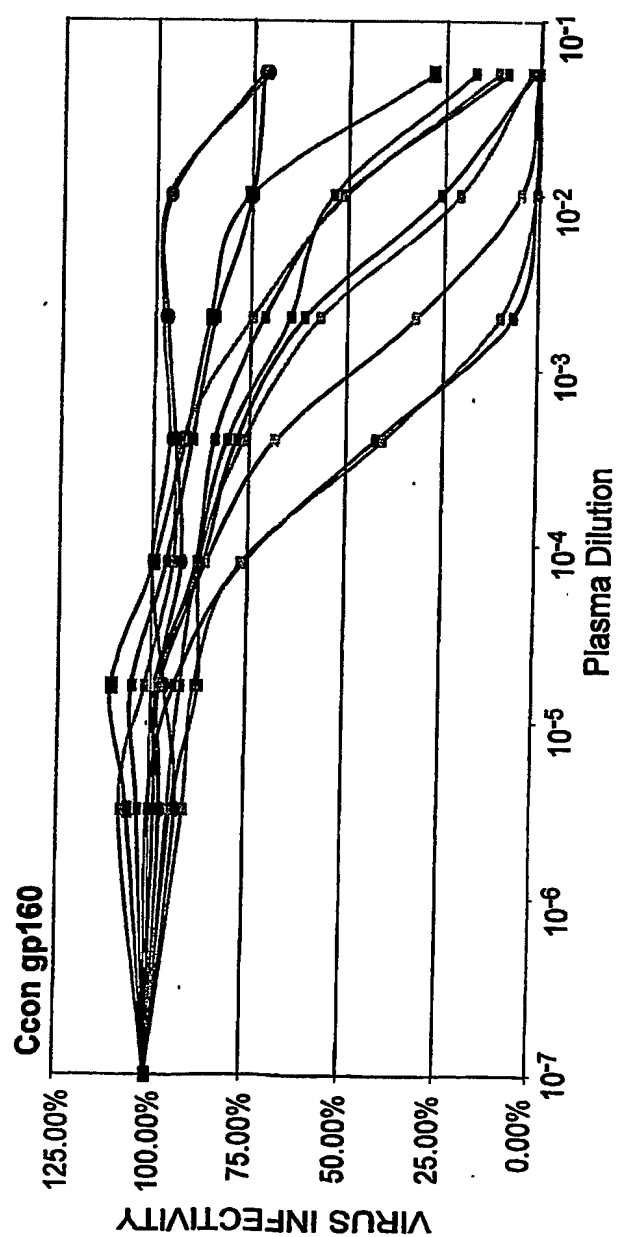


Fig. 12B



Plasma from HIV-1 subtype C infected patients



Plasma from uninfected donors



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Fig. 12C

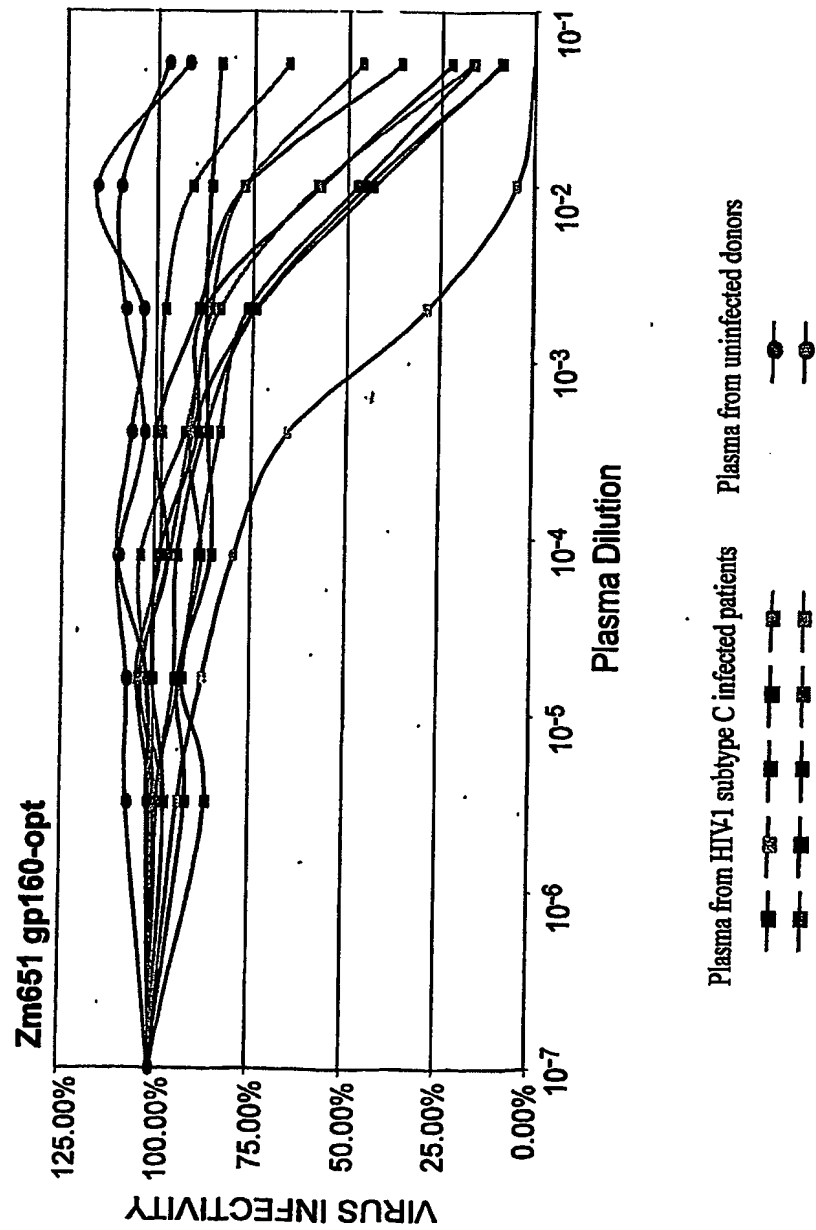


Fig. 13A



Fig. 13B

**C.con.gag (subtype C con sensus gag)**

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LQTGTEELRSLYNTVATLYCVHEKIEVRDTKEALDKIEEEQNKSQKTQQAEEAADGKVSQNYPI  
VQNLQGMVHQAI SPRTLNAWKVIEEKAFSPVIMFTALSEGATPDNLNTMLNTVGGHQAAQMMLKDT  
INEEAAEWDRLLHPVHAGPIAPGQMRPRGSDIAGTTSTL QEQIAWMTSNPPVPVGDYKRWIILGLNKIV  
RMYSVSI LDIKQGPKEPFRDYDRFFKTLRAEQATQDVKNWMTDTLLVQNA NPDC KTI LRALGPGASLE  
EMMTACQGVGSPSHKARVLA EAMSQANNTNIMMQRSNFKGPKRI V KFCNCGKEGHIARNCRAPRKKG CWK  
CGKEGHQMKDCTERQANFLGKIWP SHKGRPGN FLSRPEPTAPPAESFRFEETTPA  
PKQEPKDR EPLTSLKSLFGSDPLSQ

Fig. 13C

**C.con.nef (subtype C consenus nef)**

MGGKWSKSSIVGWPAVRERIRRTPEAAEGVGAASODLDKYGALTSSNTATNNADCAWLEAQEEEEV  
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LTFGWCFKLVVPDPREVEEANEGENNCLLHPMSQHGMEDEDEVLKWKFD SHLARHMARELHPEYYKDC

Fig. 13D



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**C.con.gag (subtype C consensus gag. Not in the public domain)**

GCCGCCGATGGGCGCCCGGCCAGCATCTGCGCGGCGGCAAGCTGGACACCTGGGAGAAGATCCGCC  
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 GACCCAGAGCCGAGGCCCGCCGACGGCAAGTGAGCCAGAACTACCCCATCGTGAGAACCTTGCGAG  
 GGCAGATGGTGACACGAGCCATCAGCCCGCACCTGAACGCTGGTGAAGTGATCGAGGAGAAGG  
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 CATGCTGAACACCGTGGGCGGCCACAGGCCGCCATGCAGATGCTGAAGGACACCATCAACGAGGAGGCC  
 GCCGAGTGGACCGCTGCACCCCGTGCAACCGCGGCCCATCGCCCCCGGCCAGATGCGCGAGCCCCCGG  
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 CCAACATCATGATGAGCGCAGCAACTTCAAGGCCCCCAAGCGCATCGTGAAGTGTCTCAACTGCGGCAA  
 GGAGGCCACATCGCCCGCAACTGCGCGCCCGCCGCAAGAGGCTGCTGGAAGTGCGGCAAGGAGGC  
 CACAGATGAAGGACTGCACCGAGCGCCAGGCCAATCTCTGGGCAAGATCTGGCCAGCCACCAAGGCC  
 GCCCGGCAACTTCTCTGAGAGCGCCCGCGAGCCACCGCCCCCGCGAGAGCTTCCGCTTCGAGGA  
 GACCAACCCCGCCCCCAAGCAGGAGCCCAAGGACCGCGAGCCCCCTGACCAGCTGAAGAGCCCTGTTCCGC  
 AGCGACCCCTGAGCCAGTAA

Fig. 13E

**C.con.nef (subtype C consensus nef. Not in the public domain)**

GCCGCCGATGGGCGGCAAGTGGAGCAAGAGCAGCATCGTGGGCTGGCCCCCGTGGCGAGCGCATCC  
 GCGCACCGAGCCCGCGGAGGCGTGGGCGCGCCAGCCAGGACCTGGACAAGTACGGCGCCCTGAC  
 CAGCAGCAACACCGCCACCAACAACCGGACTGCGCTGGCTGGAGGCCCGAGGAGGAGGAGGAGTG  
 GGCTTCCCGTGGCGCCCGAGGTGCCCCGCGCCCATGACCTACAAGGCCGCTTCGACCTGAGCTTCT  
 TCCTGAAGGAGAGGGCGCTGGAGGCGCTGATCTACAGCAAGAAGCGCCAGGAGATCCTGGACCTGTG  
 GGTGTACCAACACCCAGGCTTCTTCCCGACTGGCAGAACTACACCCCGGCCCGCGCTGCGTACCCC  
 CTGACCTTCGGCTGGTGTCTCAAGCTGGTGGCCCGTGGAACCCCGGAGGTGGAGGAGGCCAACGAGGGCG  
 AGAACAACTGCCCTGCTGACCCCATGAGCCAGCACGGCATGGAGGACCGGAGGCTGCTGAAGTG  
 GAAGTTCGACAGCCACTGGGCCCGCCCAATGGCCCGGAGCTGCAACCCGAGTACTACAAGGACTGC  
 TGA

Fig. 13F

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CONs.env (gorup M consensus env gene. This one contain the consensus sequence for variable regions in env gene)

MRVRGIQRNCQHLMRWGTLILGMLMICSAENLWTVVYGVVPWKEANTTLFCASDAKAYDTEVHNV  
WATHACVPTDPNPQEIIVLENTENFNWKNMVEQMHEDIISLDQSLKPCVKLTPLCVTLNCTNVNVTN  
TTNNTTEKGEIKNCSENIITEIRDKKQVYALFYRLDVPIDNNNNSSNYRLINCNTSAITQACPVSF  
EPIPIHYCAPAGFAILLKNDKFKNGTGPKNVSTVQCTHGKIPVSTQLLINGSLAEEIIIRSENITNN  
AKTIIIVQLNESVEINCTRPNNNTRKSIRIGPGQAFYATGDIIGDIRQAHNCISGTKNKTLQOVAKKLRE  
HFNNKTIIFKPSSGGDLIITTHSFNCRGEFFYCNSTGLFNSTWIGNGTKNNNNTNDTITLPCRKQIINM  
WQGVGOAMYAPPIEGKITCKSNITGLLLTRDGGNNNTNETEIFRPGGDMRDNNRSELYKYKVVKIEPLG  
VAPTKAKRRVVEREKRAVGIGAVFLGFLGAAGSTMGAASITLTVQARQLLSGIVQQQSNLLRAIEAQQHL  
LQLTVWGIKQLQARVLAVERYLKDQQLLGIWGCSGKLICTTVPWNSSWSNKSQDEIWDNMTWMEWEREI  
NNYTDIISLIEESQNOQEKNEQELLALDKWASLWNNFDTINWLWYIKIFIMIVGGGLIGLRIVFAVLSIV  
NRVRQGYSPISFQTLIPNPRGPDRPEGIEEGEGEQDRDRSIRLVNGFLALAWDDLRSLCIFS YHRLRDFI  
LIAARTVELLGRKGLRRGWEALKYLWNLLQYWGQELKNSAISLIDTTAIAVAEGTDRVIEVVQRACRAIL  
NIPRRIRQGLERALL

Fig. 14A

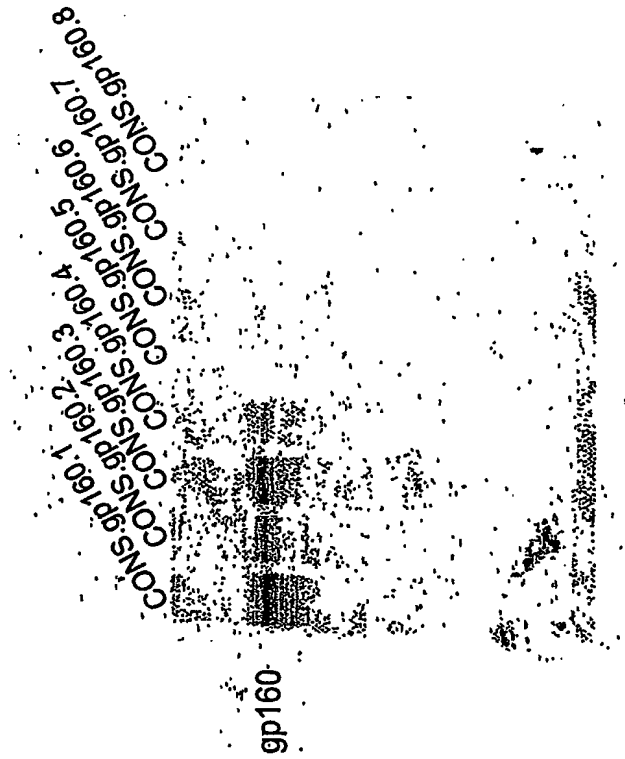
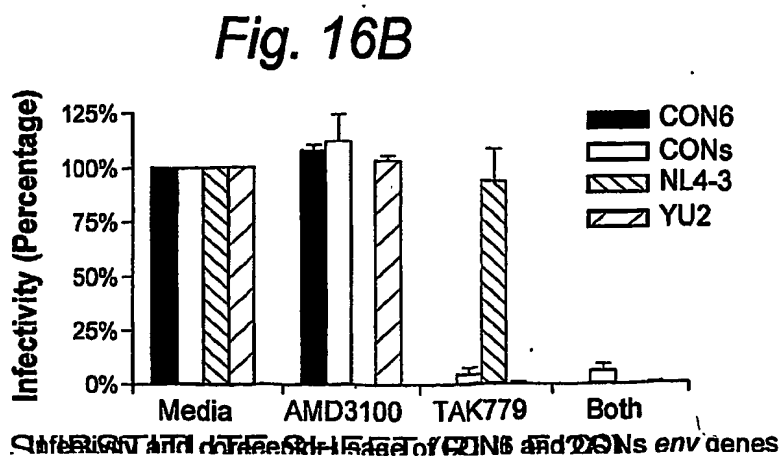
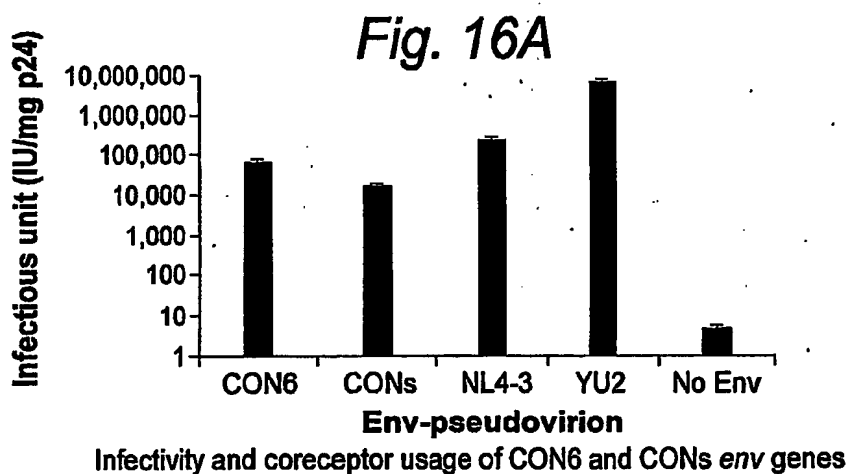
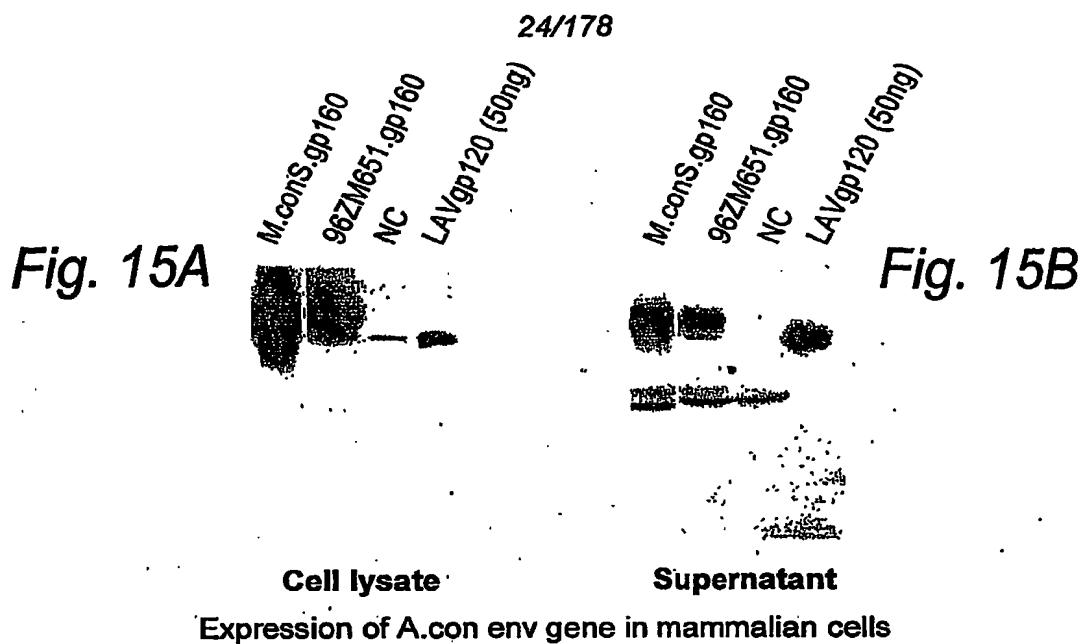


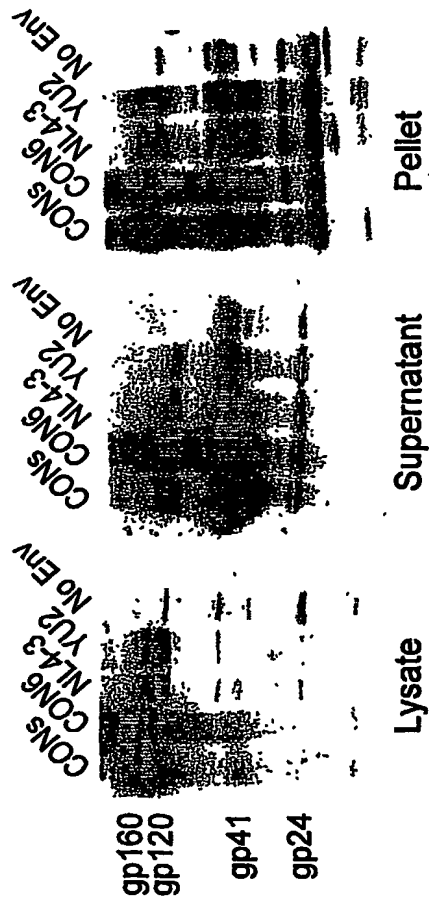
Fig. 14C

**Fig. 14B**

CONs.env (gorup M consensus env gene. This one contain the consensus sequence for variable regions in env gene. The identical amino acid sequences as in the public domain)

GCCGCCGCCATGCGCGTGCGCGGCATCCAGCGCAACTGCCAGCACCTGTG  
GCGCTGGGGCACCTGATCCTGGGCATGCTGATGATCTGCTCCGCCGCCG  
AGAACCTGTGGGTGACCGTGACTACGGCGTGCCCGTGTGGAAGGAGGCC  
AACACCACCTGTTCTGCGCTCCGACGCCAAGGCCTACGACACCGAGGT  
GCACAACGTGTGGGCCACCCACGCCTGCGTGCCACCGACCCCAACCCCC  
AGGAGATCGTGCTGGAGAACGTGACCGAGAATTCAACATGTGGAAGAAC  
AACATGGTGGAGCAGATGCACGAGGACATCATCTCCCTGTGGGACCACTC  
CCTGAAGCCCTGCGTGAAGCTGACCCCCCTGTGCGTGACCCCTGAACCTGCA  
CCAACGTGAACGTGACCAACACCACCAACAACACCGAGGAGAAGGGCGAG  
ATCAAGAACTGCTCCTTCAACATCACCACCGAGATCCGCGACAAGAAGCA  
GAAGGTGTACGCCCTGTTCTACCGCCTGGACGTGGTGCCCATCGACGACA  
ACAACAACAACCTCCTCCAACCTACCGCCTGATCAACTGCAACACCTCCGCC  
ATCACCCAGGCCGTGCCCAAGGTGTCCTTCGAGCCCATCCCCATCCACTA  
CTGCGCCCCCGCCGGCTTCGCCATCCTGAAGTGCAACGACAAGAAGTTCA  
ACGGCACCGGCCCTGCAAGAACGTGTCCACCGTGCAAGTGACCCACGGC  
ATCAAGCCCGTGGTGTCCACCCAGCTGCTGCTGAACGGCTCCCTGGCCGA  
GGAGGAGATCATCATCCGCTCCGAGAACATCACCACAACGCCAAGACCA  
TCATCGTGACGTGAACGAGTCCGTGGAGATCAACTGCACCCGCCCAAC  
AACAAACCCGCAAGTCCATCCGCATCGGCCCGGCCAGGCCCTTCTACGC  
CACCGGCGACATCATCGGCGACATCCGCCAGGCCCACTGCAACATCTCCG  
GCACCAAGTGGAAACAAGACCCTGCAGCAGGTGGCCAAGAAGCTGCGCGAG  
CACTTCAACAACAAGACCATCATCTTCAAGCCCTCCTCCGGCGGCGACCT  
GGAGATCACCAACCACTCCTTCAACTGCCGCGGCGAGTTCTTCTACTGCA  
ACACCTCCGGCCTGTTCAACTCCACCTGGATCGGCAACGGCACCAAGAAC  
AACAAACAACCAACGACACCATCACCTGCCCTGCCGCATCAAGCAGAT  
CATCAACATGTGGCAGGGCGTGGGCCAGGCCATGTACGCCCCCCCCATCG  
AGGGCAAGATCACCTGCAAGTCCAACATCACCGGCCCTGCTGCTGACCCGC  
GACGGCGGCAACAACAAACCAACGAGACCGAGATCTTCCGCCCGGCCG  
CGGCGACATGCGCGACAACCTGGCGCTCCGAGCTGTACAAGTACAAGGTGG  
TGAAGATCGAGCCCCTGGGCGTGGCCCCCACCAGGCCAAGCGCCGCGTG  
GTGGAGCGCGAGAAGCGCGCCGTGGGCATCGGCGCCGTGTTCTTGGGCTT  
CCTGGGCGCCGCGGCTCCACCATGGGCGCCGCTCCATCACCTGACCG  
TGCAGGCCCGCCAGCTGCTGTCCGGCATCGTGACGAGCAGTCCAACCTG  
CTGCGGCCATCGAGGCCAGCAGCACCTGCTGCAGCTGACCGTGTGGGG  
CATCAAGCAGCTGCAGGCCCGCGTGTGGCCGTGGAGCGCTACCTGAAGG  
ACCAGCAGCTGCTGGGCATCTGGGGCTGCTCCGGCAAGCTGATCTGCACC  
ACCACCGTGCCTTGGAACTCCTCCTGGTCCAACAAGTCCCAGGACGAGAT  
CTGGGACAACATGACCTGGATGGAGTGGGAGCGCGAGATCAACAACCTACA  
CCGACATCATCTACTCCCTGATCGAGGAGTCCCAGAACGAGCAGGAGAAG  
AACGAGCAGGAGCTGCTGGCCCTGGACAAGTGGGCCTCCCTGTGGAACCTG  
GTTTCGACATCAACAACTGGCTGTGGTACATCAAGATCTTCATCATGATCG  
TGGGCGGCCTGATCGGCCTGCGCATCGTGTTCGCCGTGCTGTCCATCGTG  
AACCGCGTGCGCCAGGGCTACTCCCCCTGTCTTCCAGACCTGATCCC  
CAACCCCCCGGCCCGGACCGCCCCGAGGGCATCGAGGAGGAGGGCGGCG  
AGCAGGACCGCGACCGCTCCATCCGCTGGTGAACGGCTTCCCTGGCCCTG  
GCCTGGGACGACCTGCGCTCCCTGTGCTGTCTCCTACCAACCGCTGCG  
CGACTTCATCCTGATCGCCGCCCGCACCGTGGAGCTGCTGGGCGGCAAGG  
GCCTGCGCCGCGGCTGGGAGGCCCTGAAGTACCTGTGGAACCTGCTGCAG  
TACTGGGGCCAGGAGCTGAAGAACTCCGCCATCTCCCTGCTGGACACCAC  
CGCCATCGCCGTGGCCGAGGGCACCGACCGCGTGATCGAGGTGGTGCAGC  
GCGCCTGCCGCGCCATCTGAACATCCCCCGCCGCATCCGCCAGGGCCTG  
GAGCGCGCCTGCTGTTA





Env protein incorporation in CON6 and CONs Env-pseudovirions

Fig. 17A Fig. 17B Fig. 17C

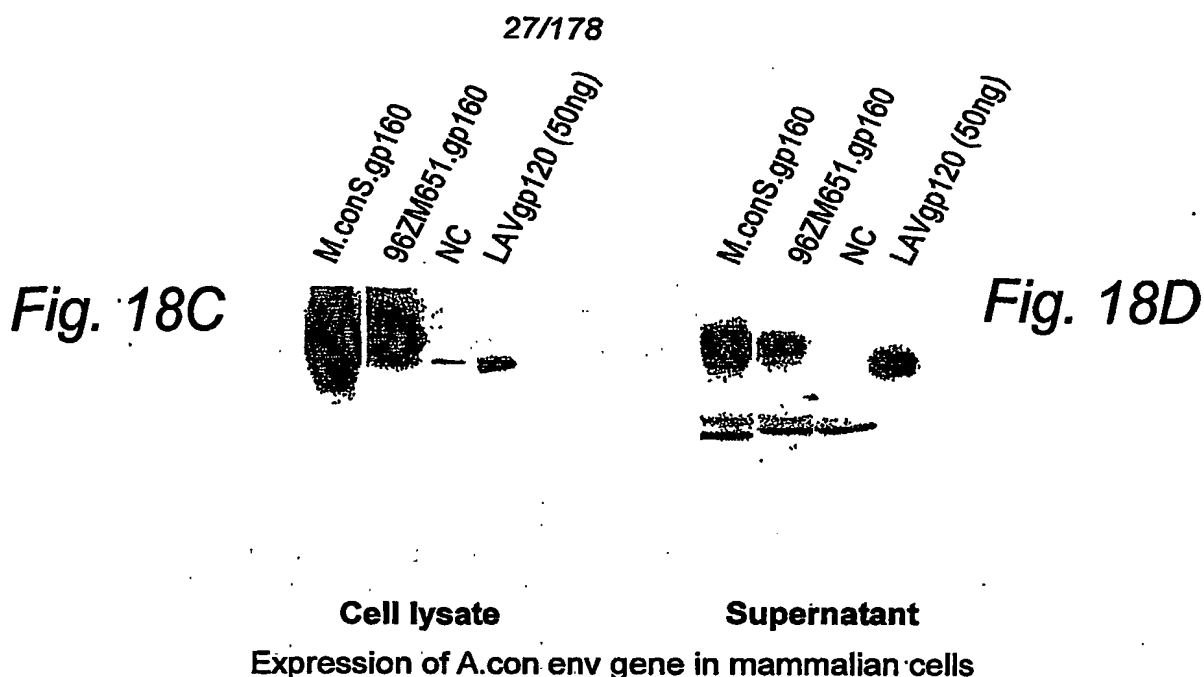
A.con.env (subtype A consensus env)

MRVMGIQRNCOHLWRWGTMIILGMIICSAEENLWTVYGVVWKAETTLFCASDAKAYDTEVHNV  
WATHACVPTDPNPQEIENLVTEEFNMWKNMVEQMHTDIIISLMDQSLKPCVKLTPLCVTLNCSNVNVTI  
NITNITDNMKGKIKNCSEFNMVTELRDCKKQKVSIFYKLDVVQINKSNSSSQYRLINCNTSAITQACPQVS  
FEPPIHYCAPAGFAILKCKDKEFNGTGPCKNVSTVQCTHGIKPVVSTQLLNLNGSLAEEVEMIRSENITN  
NAKNIIVQLTKPVKINCTRPNNWTRKSIIRIGPGQAFYATGDIIGDIRQAHCNVSRTEWNETLQKVAQLR  
KYFNNKTIIFTNSSGGDLEITTHSFNCGEFFYCNSTGLFNSTWNGNGTKKKNSTESNDTITLPCRIKQI  
INMWQRVQAMYPPIQGVIRCESNITGLLLTRDGGDNNSKNETFRPGGDMRDNRSELYKKYKVKIEP  
LGVAPTAKARRVVEREKRAVGIGAVFLGFLGAAGSTMGAASITLTVQARQLLSGIVQQSNLLRAIEAQQ  
HLLKLTWVGIKQLQARVLAVERYLKDQQLLIGWCSGKLICTTNVPMNWSNKSQSEIWDNMTWLQWDK  
EISNYTDIIYNLIEESQNOQEKNEQDALLDQWANLW NWFEDISNLWYIKIFIMIVGGLIGLIVFAVLS  
VINRVQGYSPLSFQTHTPNPGGLDRPGRIEEEGEGQGRDRSIRLVSGFLALAWDDLRSCLFSYHRLRD  
FILIAARTVELLGHSSKGLRLGWEGKYLWNLLLYWGRELKISAINLLDTIAIAGVAGWTDVRVIEIGQRI  
CRAILNIPRRIRQGLERALL

Fig. 18A

**Fig. 18B**

[illegible]

**Fig. 19A**

M.con.gag (group M consensus gag. Identical amino acid sequence to that in the public domain)

GCCGCCGCCATGGGCGCCCGCGCCTCCGTGCTGTCCGGCGGCAAGCTGGA  
CGCCTGGGAGAAGATCCGCCTGCGCCCCGGCGGCAAGAAGAAGTACCGCC  
TGAAGCACCCTGGTGTGGGCCTCCCGCGAGCTGGAGCGCTTCGCCCTGAAC  
CCCGGCCTGCTGGAGACCTCCGAGGGCTGCAAGCAGATCATCGGCCAGCT  
GCAGCCCGCCCTGCAGACCGGCTCCGAGGAGCTGCGCTCCCTGTACAACA  
CCGTGGCCACCCTGTACTGCGTGCAACAGCGCATCGAGGTGAAGGACACC  
AAGGAGGCCCTGGAGAAGATCGAGGAGGAGCAGAACAAGTCCAGCAGAA  
GACCCAGCAGGCGCCGCCGACAAGGGCAACTCCTCCAAGGTGTCCAGAA  
ACTACCCCATCGTGCAGAACCTGCAGGGCCAGATGGTGCACCAGGCCATC  
TCCCCCGCACCTGAACGCCTGGGTGAAGGTGATCGAGGAGAAGGCCTT  
CTCCCCGAGGTGATCCCCATGTTCTCCGCCCTGTCCGAGGGCGCCACCC  
CCCAGGACCTGAACACCATGCTGAACACCGTGGGCGGCCACCAGGCCGCC  
ATGCAGATGCTGAAGGACACCATCAACGAGGAGGCGCCGAGTGGGACCG  
CCTGCACCCCGTGCACGCGGCCCCATCCCCCGGCCAGATGCGCGAGC  
CCCGCGGCTCCGACATCGCCGGCACCACCTCCACCCTGCAGGAGCAGATC  
GCCTGGATGACCTCCAACCCCCCATCCCCGTGGGCGAGATCTACAAGCG  
CTGGATCATCTGGGCCTGAACAAGATCGTGCAGCATGTACTCCCCGTGT  
CCATCCTGGACATCCGCCAGGGCCCCAAGGAGCCCTTCCGCGACTACGTG  
GACCGCTTCTTCAAGACCCTGCGCGCCGAGCAGGCCACCCAGGACGTGAA  
GAACTGGATGACCGACACCCTGCTGGTGCAGAACGCCAACCCGACTGCA  
AGACCATCCTGAAGGCCCTGGGCCCCGGCGCCACCCTGGAGGAGATGATG  
ACCGCCTGCCAGGGCGTGGGCGGCCCGGCCACAAGGCCCGCTGCTGGC  
CGAGGCATGTCCCAGGTGACCAACGCCGCCATCATGATGCAGCGCGGCA  
ACTTCAAGGGCCAGCGCCGCATCATCAAGTGCTTCAACTGCGGCAAGGAG  
GGCCACATCGCCCGCAACTGCCGCGCCCCCGCAAGAAGGGCTGCTGGAA  
GTGCGGCAAGGAGGGCCACCAGATGAAGGACTGCACCGAGCGCCAGGCCA  
ACTTCCTGGGCAAGATCTGGCCCTCCAACAAGGGCCGCCCGGCAACTTC  
CTGCAGTCCCGCCCCGAGCCACCGCCCCCCCCGCGAGTCCTTCGGCTT  
CGGCGAGGAGATCACCCCTCCCCCAAGCAGGAGCCCAAGGACAAGGAGC  
CCCCCTGACCTCCCTGAAGTCCCTGTTTCGGCAACGACCCCTGTCCCAG  
TGA

M.con.pol.nuc

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Fig. 19B

GCCGCCGCATGCCCCAGATCACCCTGTGGCAGCGCCCCCTGGTGACCAT  
CAAGATCGGCGGCCAGCTGAAGGAGGCCCTGCTGGCCACCGGCGCCGACG  
ACACCGTGCTGGAGGAGATCAACCTGCCCGGCAAGTGGAAGCCCAAGATG  
ATCGGCGGCATCGGCGGCTTCATCAAGGTGCGCCAGTACGACCAGATCCT  
GATCGAGATCTGCGGCAAGAAGGCCATCGGCACCGTGCTGGTGGGCCCCA  
CCCCCGTGAACATCATCGGCCGCAACATGCTGACCCAGATCGGCTGCACC  
CTGAACTTCCCCATCTCCCCCATCGAGACCGTGCCCGTGAAGCTGAAGCC  
CGGCATGGACGGCCCCAAGGTGAAGCAGTGGCCCCCTGACCGAGGAGAAGA  
TCAAGGCCCTGACCGAGATCTGCACCGAGATGGAGAAGGAGGGCAAGATC  
TCCAAGATCGGCCCGGAGAACCCTACAACACCCCCATCTTCGCCATCAA  
GAAGAAGGACTCCACCAAGTGGCGCAAGCTGGTGGACTTCCGCGAGCTGA  
ACAAGCGCACCCAGGACTTCTGGGAGGTGCAGCTGGGCATCCCCACCCC  
GCCGGCCTGAAGAAGAAGAAGTCCGTGACCGTGCTGGACGTGGGCGACGC  
CTACTTCTCCGTGCCCCCTGGACGAGGACTTCCGCAAGTACACCGCCTTCA  
CCATCCCCTCCATCAACAACGAGACCCCCGGCATCCGCTACCAGTACAAC  
GTGCTGCCCCAGGGCTGGAAGGGCTCCCCCGCCATCTTCCAGTCTCCAT  
GACCAAGATCCTGGAGCCCTTCCGCACCCAGAACCCCGAGATCGTGATCT  
ACCAGTACATGGACGACCTGTACGTGGGCTCCGACCTGGAGATCGGCCAG  
CACCGCGCCAAGATCGAGGAGCTGCGCGAGCACCTGCTGCGCTGGGGCTT  
CACCACCCCCGACAAGAAGCACCAAGGAGCCCCCTTCTGTGGATGG  
GCTACGAGCTGCACCCCGACAAGTGGACCGTGACGCCCATCCAGCTGCC  
GAGAAGGACTCCTGGACCGTGAACGACATCCAGAAGCTGGTGGGCAAGCT  
GAACTGGGCCTCCAGATCTACCCCGGCATCAAGGTGAAGCAGCTGTGCA  
AGCTGCTGCGCGGCGCCAAGGCCCTGACCGACATCGTGCCCCTGACCGAG  
GAGGCCGAGCTGGAGCTGGCCGAGAACCGCGAGATCCTGAAGGAGCCCGT  
GCACGGCGTGTACTACGACCCCTCCAAGGACCTGATCGCCGAGATCCAGA  
AGCAGGGCCAGGACCAAGTGGACCTACCAGATCTACCAGGAGCCCTTCAAG  
AACCTCAAGACCGGCAAGTACGCCAAGATGCGCTCCGCCCCACCAACGA  
CGTGAAGCAGCTGACCGAGGCCGTGCAGAAGATCGCCACCGAGTCCATCG  
TGATCTGGGGCAAGACCCCCAAGTTCCGCCTGCCCATCCAGAAGGAGACC  
TGGGAGACCTGGTGGACCGAGTACTGGCAGGCCACCTGGATTCCCGAGTG  
GGAGTTCTGTGAACACCCCCCCCCCTGGTGAAGCTGTGGTACCAGCTGGAGA  
AGGAGCCCATCGCCGGCGCGAGACCTTCTACGTGGACGGCGCCGCCAAC  
CGCGAGACCAAGCTGGGCAAGGCCGGCTACGTGACCGACCGCGGCCGCCA  
GAAGGTGGTGTCCCTGACCGAGACCACCAACCAGAAAACGAGCTGCAGG  
CCATCCACCTGGCCCTGCAGGACTCCGGCTCCGAGGTGAACATCGTGACC  
GACTCCCAGTACGCCCTGGGCATCATCCAGGCCAGCCCGACAAGTCCGA  
GTCCGAGCTGGTGAACCAGATCATCGAGCAGCTGATCAAGAAGGAGAAGG  
TGTAACCTGTCTGGGTGCCCGCCACAAGGGCATCGGCCGCCAACGAGCAG  
GTGGACAAGCTGGTGTCCAACGGCATCCGCAAGGTGCTGTTCTGGACGG  
CATCGACAAGGCCCAGGAGGAGCACGAGAAGTACCACTCCAACCTGGCGCG  
CCATGGCCTCCGACTTCAACCTGCCCCCATCGTGGCCAAGGAGATCGTG  
GCCTCCTGCGACAAGTGCCAGCTGAAGGGCGAGGCCATGCACGGCCAGGT  
GGACTGCTCCCCCGGCATCTGGCAGCTGGACTGCACCCACCTGGAGGGCA  
AGATCATCCTGGTGGCCGTGCACGTGGCCTCCGGCTACATCGAGGCCGAG  
GTGATCCCCGCCGAGACCGGCCAGGAGACCGCCTACTTCATCCTGAAGCT  
GGCCGGCCGCTGGCCCGTGAAGGTGATCCACACCGACAACGGCTCCAAC  
TCACCTCCGCCCGCGTGAAGGCCGCTGCTGGTGGGCCCGGCATCCAGCAG  
GAGTTCGGCATCCCCTACAACCCCCAGTCCCAGGGCGTGGTGGAGTCCAT  
GAACAAGGAGCTGAAGAAGATCATCGGCCAGGTGCGCGACAGGCCGAGC  
ACCTCAAGACCGCCGTGCAGATGGCCGTGTTTCATCCACAACCTTCAAGCGC  
AAGGGCGGCATCGCGGCTACTCCGCGGCGAGCGCATCATCGACATCAT  
CGCCACCGACATCCAGACCAAGGAGCTGCAGAAGCAGATCACCAAGATCC  
AGAACTTCCGCGTGTACTACCGCGACTCCCGCGACCCCATCTGGAAGGGC  
CCCGCCAAGCTGCTGTGGAAGGGCGAGGGCGCCGTGGTGTATCCAGGACAA  
CTCCGACATCAAGGTGGTGGCCCGCCGCAAGGCCAAGATCATCCGCGACT  
ACGGCAAGCAGATGGCCGGCGACGACTGCGTGGCCGGCCCGCCAGGACGAG



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**Fig. 19C**

M.con.nef (group M consensus nef. Identical amino acid sequence to that in the public domain)

GCCGCCGCCATGGGCGGCAAGTG GTCCAAGTCCTCATCGTGGGCTGGCC  
CGCCGTGCGCGAGCGCATCCGCGCACCACCCCGCCGCCGAGGGCGTGG  
GCGCCGTGTC CAGGACCTGGACAAGCA CGGCGCCATCACCTCCTCCAAC  
ACCGCCGCCAACAAACC CGACTGCGCCTGGCTGGAGGCCAGGAGGAGGA  
GGAGGAGGTGGGCTTC CCGTGC GCCCAGGTGCCCTGCGCCCATGA  
CCTACAAGCCGCCCTGGACCTGTC CACTTCCTGAAGGAGAAGGCCGC  
CTGGAGGGCCTGATCTACTCCAGAAGCGCCAGGAGATCCTGGACCTGTG  
GGTGTAACCA CACCCAGGGCTACTTC CCGACTGGCAGAAC TACACCCCG  
GCCC CGGCATCCGCTACCCCTGACTT CCGCTGGTGCTTCAAGCTGGTG  
CCCGTGGACCCGAGGAGGTGGAGGAGGCCAACGAGGGCGAGAACAATC  
CCTGCTGCA CCCCATGTG CAGCACGGCATGGAGGACGAGGAGCGCGAGG  
TGCTGATGTGAAGTTCGACTCCCGCCTGGCCCTGCGCCACATCGCCGC  
GAGCTGCACCCGAGTACTACAAGGACTGCTAA

**Fig. 19D**

C.con.pol.nuc

GCCGCCGCCATGCCCCAGATCACCTGTGGCAGCGCCCCCTGGTGTCAT  
CAAGGTGGGCGGCCAGATCAAGGAGGCCCTGCTGGCCACCGCGCCGACG  
ACACCGTGCTGGAGGAGATCAACCTGCCCGCAAGTGGAAGCCCAAGATG  
ATCGGCGGCATCGGCGGCTTCATCAAGGTGCGCCAGTACGACCAGATCCT  
GATCGAGATCTGCGGCAAGAAGGCCATCGGCACCGTGCTGGTGGGCCCCA  
CCCCCGTGAACATCATCGGCCGAACATGCTGACCCAGCTGGGCTGCACC  
CTGAACCTCCCCATCTCCCCATCGAGACCGTGCCCGTGAAGCTGAAGCC  
CGGCATGGACGGCCCCAAGGTGAAGCAGTGGCCCTGACCGAGGAGAAGA  
TCAAGGCCCTGACCGCCATCTGCGAGGAGATGGAGAAGGAGGGCAAGATC  
ACCAAGATCGGCCCCGAGAACCCCTACAACACCCCGTGTTCCGCCATCAA  
GAAGAAGGACTCCACCAAGTGGCGCAAGCTGGTGGACTTCCGCGAGCTGA  
ACAAGCGCACCCAGGACTTCTGGGAGGTGCAGCTGGGCATCCCCACCCC  
GCCGGCCTGAAGAAGAAGAAGTCCGTGACCGTGCTGGACGTGGGCGACGC  
CTACTTCTCCGTGCCCCCTGGACGAGGGCTTCCGCAAGTACACCGCCTTCA  
CCATCCCCCTCATCAACAACGAGACCCCGGCATCCGCTACCAGTACAAC  
GTGCTGCCCCAGGGCTGGAAGGGCTCCCCCGCCATCTTCCAGTCCCTCAT  
GACCAAGATCCTGGAGCCCTTCCGCGCCAGAACCCCGAGATCGTGATCT  
ACCAGTACATGGACGACCTGTACGTGGGCTCCGACCTGGAGATCGGCCAG  
CACCGCGCCAAGATCGAGGAGCTGCGCGAGCACCTGCTGAAGTGGGGCTT  
CACCACCCCGACAAGAAGCACCAAGGAGCCCCCTTCTGTGGATGG  
GCTACGAGCTGCACCCCGACAAGTGGACCGTGACGCCATCCAGCTGCC  
GAGAAGGACTCCTGGACCGTGAACGACATCCAGAAGCTGGTGGGCAAGCT  
GAACCTGGGCTTCCAGATCTACCCCGGCATCAAGGTGCGCCAGCTGTGCA  
AGCTGCTGCGCGGCGCCAAGGCCCTGACCGACATCGTGCCCTGACCGAG  
GAGGCCGAGCTGGAGCTGGCCGAGAACCGCGAGATCCTGAAGGAGCCCGT  
GCACGGCGTGTA CTACGACCCCTCCAAGGACCTGATCGCCGAGATCCAGA  
AGCAGGGCCACGACCAAGTGGACCTACCAGATCTACCAGGAGCCCTTCAAG  
AACCTCAAGACCGGCAAGTACGCCAAGATGCGCACCGCCCAACCAACGA  
CGTGAAGCAGCTGACCGAGGCCGTGCAGAAGATCGCCATGGAGTCCATCG  
TGATCTGGGGCAAGACCCCAAGTTCGCGCTGCCATCCAGAAGGAGACC  
TGGGAGACCTGGTGGACCGACTACTGGCAGGCCACCTGGATTCCCGAGTG  
GGAGTTCTGTGAACACCCCCCCCTGGTGAAGCTGTGGTACCAGCTGGAGA  
AGGAGCCCTGCGCTGTGTGAGACCTTCTAGTTCAGGCGCCGCCAAC

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CGGAGACCAAGATCGGCAAGCCGGCTACGTGACCGACCGCGCGGCCA  
 GAAGATCGTGTCCCTGACCGAGACCACCAACAGAAAACCGAGCTGCAGG  
 CCATCCAGCTGGCCCTGCAGACTCCGGCTCCGAGGTGAACATCGTGACC  
 GACTCCAGTACGCCCTGGCATCATCCAGGCCAGCCCGACAAGTCCGA  
 GTCCGAGCTGGTGAACAGATCATCGAGCAGCTGATCAAGAAGGAGCGCG  
 TGTACTGTCTGGTGCCCGCCCAAGGGCATCGGCGCAACGAGCAG  
 GTGGACAAGCTGGTGTCTCCGGCATCCGCAAGGTGCTGTTCTGGACGG  
 CATCGACAAGGCCAGGAGGAGCACGAGAAAGTACCATCCAACTGGCGCG  
 CCAATGGCCCTCCGAGTTCAACTGCCCCCATCGTGGCCAAAGGAGATCGTG  
 GCCTCTGCGACAAGTCCAGCTGAAGGGCGAGGCCATGACGGCCAGGT  
 GGACTGCTCCCCCGGCATCTGGCAGCTGGACTGCACCCACCTGGAGGGCA  
 AGATCATCTGTGGCCGTGCACGTGGCTCCGGCTACATCGAGGCCGAG  
 GTGATCCCCCGGAGACCGGCCAGGAGACCGCTACTTCACTCTGAAGCT  
 GGCCGGCGCTGGCCGTGAAGGTGATCCACACCGACAACGGCTCCAAC  
 TCACCTCCGCGCGGTGAAGCCGCTGCTGGTGGCCGGCATCCAGCAG  
 GAGTTCGGCATCCCCTACAACCCCCAGTCCAGGGCGTGGTGGAGTCCAT  
 GAACAAGGAGCTGAAGAAGATCATCGGCCAGGTGCGGACCGAGCCGAGC  
 ACCTCAAGACCGCCGTGAGATGGCCGTGTTTCATCCACAACCTCAAGCGC  
 AAGGCGGCATCGGCGGTACTCCGCGCGGAGCGCATCATCGACATCAT  
 CGCCACCGACATCCAGACCAAGGAGCTGCAGAGCAGATCATCAAGATCC  
 AGAATTCCGCGTGTACTACCGGACTCCCGGACCCCATCTGGAAGGGC  
 CCGCCCAAGCTGTGTGAAGGGCGAGGGCGCGTGGTGTATCCAGGACAA  
 CTCGACATCAAGTGTGTCCTCCCGCGCAAGGCCAAGATCATCAAGGACT  
 ACGGCAAGCAGATGGCCGGCGCGCATGCTGCTGGCCGGCCCGCAGGACGAG  
 GACTAA

Fig. 19D (continued)

## M.con.gag (group M consensus gag)

MGARASVLSGGKLDWEKIRLRPGGKKYRLKHLVWASRELERFALNPLLETSEG CKQIIGQLQPA  
 LQTGSEELRSLYNTVATLYCVHQRIEVKDTKEALEKIEEQNKSSQKIQAAADKGNSSKVSQNYPIVQN  
 LQQMVHQAI SPRTLNAWVKVIEEKAFSPEVIMFSAISEGATPQDLNLTMLNTVGGHQAAQMQLKDTINE  
 EAAEWDRLHPVHAGPIPPGQMRPRGSDIAGTTSTLQEQIAWMTSNPPIPVGEIYKRWIILGLNKIVRM  
 SPVSIILDIRQPKPEFRDYVDRFFKTLRAEQATQDVKNWMTDTLLVQANPDCKTILKALPGATLEEM  
 TACQGVGGPGHKARVLAEMSQVTNAAIMMQRGNFKGQRIIKCFNCGKEGHIARNCRAPRKKGCWCKGK  
 EGHQMKDCTERQANFLGKIWPSNKGPRPGNFLOSRPEPTAPAESFGFGEETTPSPKQEPKDKPEPPLTSLK  
 SLFGNDPLSQ

Fig. 19E

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Fig. 19F

M.con.pol (group M consensus pol)  
 MPQITLWQRPLVTJGGGQLKEALLaTGADDTVLEEINLPKWKPKMIGGIGGFIKVRQYDQILIEIGK  
 KAIGTVLVGPTPVNIIGNMLTQIGCTLNFIPIETVPVKLPKMGDPKVKQWPLTEEKIKALTEICTE  
 MEKEGKISIGPENPYNTPIFAIKKDKSTKWRKLVDFRELNKRTQDFWEVQLGIPHPAGLKKKKSVTVD  
 VGDAYSFVPLDEDFRIKYTAFTIPSINNETPIRYQYNVLPQGWKSPAFQSSMTKILEPFRFTQNPIM  
 YQYMDLTVGSDLEIGQHRAKIEELREHLRWGFTTPDKKHQKEPFLWMGYELHPDKWTVQPIQLPEKD  
 SWTVNDIQKLVGKLWASQIYPGIKVKQLCKLLRGAKALTDIVPLTEEALELEAENREILKEPVHGVYD  
 PSKDLIAEIQKGGQDQWYQIYQEPFNKLTGKYAKMRSATNDVKQLTEAVQKIATESIMWGKTPKFR  
 LPIQKETWETWWTYWQATWIPWEFVNTPLVKLWYQLEKEPIAGAEFTYVDGAANRETKLGKAGYVTD  
 RGRQKVSLETETNQKTELQAIHLALQDSGSEVNIVTDSQYALGIQAQPKSESELVNQIEQLIKKEK  
 VYLSWPAHKGIGGNEQVDKLVSTGIRKVLFLDGIDKAQEEHEKYHSNWRAMASDFNLPPIVAKEIVASC  
 DKQALGGEAMHGQVDCSPGIWQLDCTHLEGKILVAVHVASGYEAEVPAETGQETAYFILKLAGRWPV  
 KVIHTDNGSNFTSAVKAACWAGIQQEFPIPNPQSQGWESNMKELKKIGQVRDQAEHLKTAVQMAV  
 FIHFKRKGIGGYSAGERIIDIAITDIQTKELQKQITKQNFVYRDSRDPWKGPAKLLWKGEQAV  
 IQDNSDIKVVPRRKAKIIRDYGKQMGAGDCCVAGRQDED

## M.con.nef (group M consensus nef)

MGGKWSKSSIVGWPAVRERIRRTHTPAARGVGAVSQDLDKHGALTSSNTAANNPDCAWLEAQEEEEVEVGFP  
 VRPQVPLRPMTYKAALDLSHFLKEKGGLEGLIYSKKRQELDLWVYHTQGYFPDQWQNTTPGPIRYPLTF  
 GWCFLKVPVDPEEVEEANEGENNSLLHPMCQHGMEDEEREVLMMKFDLSRLARHIARELHPEYKDC

Fig. 19G

C.con.pol (subtype C consensus pol)  
 MPQITLWQRPLVSIKVGQIKEALLaTGADDTVLEEINLPKWKPKMIGGIGGFIKVRQYDQILIEIGK  
 KAIGTVLVGPTPVNIIGNMLTQIGCTLNFIPIETVPVKLPKMGDPKVKQWPLTEEKIKALTAICEE  
 MEKEGKISIGPENPYNTPIFAIKKDKSTKWRKLVDFRELNKRTQDFWEVQLGIPHPAGLKKKKSVTVD  
 VGDAYSFVPLDEDFRIKYTAFTIPSINNETPIRYQYNVLPQGWKSPAFQSSMTKILEPFRFTQNPIM  
 YQYMDLTVGSDLEIGQHRAKIEELREHLRWGFTTPDKKHQKEPFLWMGYELHPDKWTVQPIQLPEKD  
 SWTVNDIQKLVGKLWASQIYPGIKVKQLCKLLRGAKALTDIVPLTEEALELEAENREILKEPVHGVYD  
 PSKDLIAEIQKGGQDQWYQIYQEPFNKLTGKYAKMRTAHTNDVKQLTEAVQKIAMESIVWGKTPKFR  
 LPIQKETWETWWTYWQATWIPWEFVNTPLVKLWYQLEKEPIAGAEFTYVDGAANRETKIGKAGYVTD  
 RGRQKVSLETETNQKTELQAIHLALQDSGSEVNIVTDSQYALGIQAQPKSESELVNQIEQLIKKEK  
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 DKCQLGGEAMHGQVDCSPGIWQLDCTHLEGKILVAVHVASGYEAEVPAETGQETAYFILKLAGRWPV  
 KVIHTDNGSNFTSAVKAACWAGIQQEFPIPNPQSQGWESNMKELKKIGQVRDQAEHLKTAVQMAV  
 FIHFKRKGIGGYSAGERIIDIAITDIQTKELQKQIKNFVYRDSRDPWKGPAKLLWKGEQAV  
 IQDNSDIKVVPRRKAKIIRDYGKQMGAGDCCVAGRQDED

Fig. 19H

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*Fig. 20A*

B.con.gag (subtype B consensus gag. The amino acid sequence is different from Los Alamos Database August 2002)

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GCCGCCGCCATGGGCGCCCGCGCCTCCGTGCTGTCCGGCGGCGAGCTGGA
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ATGCAGATGCTGAAGGAGACCATCAACGAGGAGGCCGCCGAGTGGGACCG
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GGCTGGATGACCAACAACCCCCCATCCCCGTGGGCGAGATCTACAAGCG
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GAAGTGCGGCAAGGAGGGCCACCAGATGAAGGACTGCACCGAGCGCCAGG
CCA ACTTCTGGGCAAGATCTGGCCCTCCCAAGGGCCGCCCGGCAAC
TTCTTGCAGTCCCGCCCCGAGCCCAAGCCCCCCCCGAGGAGTCTTCCG
CTTTCGGCGAGGAGACCACCAACCCCTCCAGAAAGCAGGAGCCCATCGACA
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TCCTCCAGTAA
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*Fig. 20B*

B.con.env (subtype B consensus env. The amino acid sequence is different from Los Alamos Database August 2002)

GCCGCCGCCATGCGCGTGAAGGGCATCCGCAAGAACTACCAGCACCTGTG  
 GCGCTGGGGCAACCATGCTGCTGGGCATGCTGATGATCTGCTCCGC CGCCG  
 AGAAGCTGTGGGTGACCGTGTA CTACGG CGTGCCCGTGTGGAAGGAGGCC  
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 GCACAA CGTGTGGGCCACCCACGCTGCGTGCCCA CCGACCCCAA CCCCC  
 AGGAGGTGGTGCTGGAGAACGTGACCGAGA ACTTCAACATGTGGAAGAAC  
 AACATGGTGGAGCAGATGCACGAGGACATCATCTCCCTGTGGGAC CAGT C  
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 CCGCGACAAGGTGCAAGAGGAGTACGCCCTGTTCTACAAGCTGGA CGTGG  
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 ACCTGGAACAACACCAAGGACAAGAACA CCATCAC CCGTGCCTGCGCGCAT  
 CAAGCAGATCATCAACATGTGGCAGGAGGTGGGCAAGGCCATGTA CGCCC  
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 GTGGGGCATCAAGCAGCTGCAGGCCCGCGTGCTGGCCGTGGAGCGCTACC  
 TGAAGGACCAGCAGCTGCTGGGCATCTGGGGCTGCTCCGGCAAGCTGATC  
 TGCA CCAACCACCGTGCCTGGAA CGCCTCTGGTCAACAAGTCCCTGGA  
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 GAACTGGTTTGACATCACCAACTGGCTGTGGTACA TCAAGATCTTCA TCA  
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 GCGCGAGCGCGACCGCGACCGCTCGGCCGCTGGTGGAGCGGCTTCTG  
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 GCCGCGCCATCTGCA CATCCCGCGCATCCGCGCAGGGCTGGAGCGC  
 GCCCTGCTGTAA

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**Fig. 20B**

**B.con.env (subtype B consensus env. The amino acid sequence is different from Los Alamos Database August 2002)**

GCCGCCGCCATGCGCGTGAAGGGCATCCGCAAGAACTACCAGCACCTGTG  
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 ACCACCACCCTGTTCTGCGCCTCCGACGCCAAGGCCTACGACACCGAGGT  
 GCACAACTGTGGGCCACCCACGCTGCGTGCCCAACGACCCCAACCC  
 AGGAGGTGGTGCTGGAGAACGTGACCGA GAACTTCAACATGTGGAAGAAC  
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 CCGACCTGAAGAACAACTGCTGAACACCAACTCCTCCTCCGGCGAGAAAG  
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 GCCCTGCTGTAA

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Fig. 20C

**B.con.gag (subtype B consensus gag)**

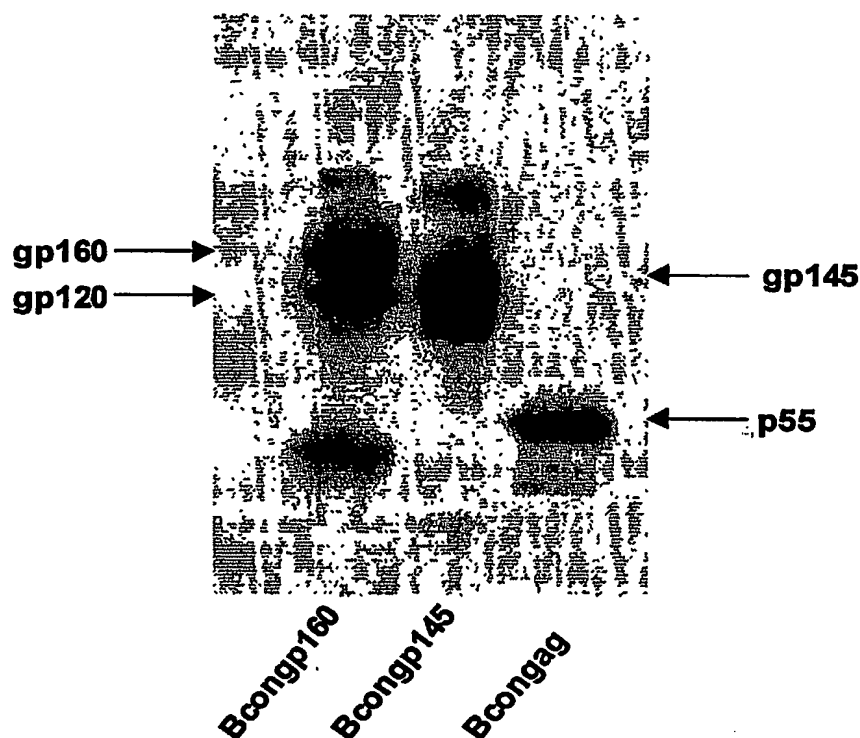
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 QMVHQAI SPRTLNAWKVVEEKAFSPEVIPMFSALEGATPQDLNTMLNTVGGHQAAMQMLKETINEEAA  
 EWDRLHPVHAGPIAPGQMRPRGSDIAGTSTLQEQIGWMTNNPPIPVGEIYKRWIIILGNKIV RMYSP  
 SILDIRQGPKEPFRDYVDRFYKTLRAEQASQEVKNWMTETLLVQNPANPDKTILKALGPAATLEEMMTAC  
 QGVGGPGHKARVLAEAMSQVNSATIMMQRGNFRNRKTKVCFNCGKEGHIACNCRAPRKKGCWKCGKEG  
 HQMKDCTERQANFLGKIWP SHKGRPGNFLQSRPEPTAPPEESFRFGEETTTTPSQKEPIDKELYPLASLR  
 SLFGNDPSSQ

Fig. 20D

**B.con.env (subtype B consensus env)**

MRVKGIRKNYQHLNRWGTMLLGMLMICSAAEKLWTV YYGVPVWKEATTTLFCASDAKAYDTEVHNVWAT  
 HACVPTDPNPQEVVLENTENFNMMWNMMVEQMHEDIISLWDQSLKPCVKLTPLCVTLNCTDLKNNLLNT  
 NSSGGEKMEKEIKNCNFNITTSIRDKVQKEYALFYKLDVVPIDNNNNTSYRLISCNSTSVITQACPVSF  
 EPIPIHYCAPAGFAILLKNDKKFNGTGPCTNVSTVQCTHGIRPVVSTQLLLNGSLAEDEVIRSENFTDN  
 AKTIIVQLNESVEINCTRPNNNTRKSIHIGPGRAFYTTGEIIGDIRQAHCNISRAKWNNTLKQIVKKLRE  
 QFGNKTIVFNQSSGDPETVMHSFNCGGEFFYCNLTQLFNSTWNDNGTWNNTKDKNFTTLPCKRIKQIINM  
 WQEVGKAMYAPPIRGQIRCSSNITGLLLTRDGGNNNDTEIFRPGGDMRDNRSELYKYKVVKIEPLGV  
 APTKAKRRVVQREKRAVGIGAMFLGFLGAAGSTMGAASMTLTVQARQLLSGIVQQQNNLLRAIEAQQHLL  
 QLTWGIKQLQARVLAVERYLKDQQLLGIWCCSGKLICTTTPWNASWSNKSLSDEIWDNMTWMEWEREID  
 NYTSLIYTLIEESQOQEKNEQELLELDKWA SLWNWFDITNWLWYIKIFIMIVGGLIGLRIVFAVLSIVN  
 RVROGYSPLSFQTRLPA PRGPDRPEGIEEGGERDRDRSRLVDGFLALIWDDLRLSLCLFSYHRLRDL  
 IVTRIVELLGRRGWEVLKYWNLLQYWSQELKNSAVSLNATAIAVAEGTDRVIEVVQACRAILHIPP  
 IRQGLERALL

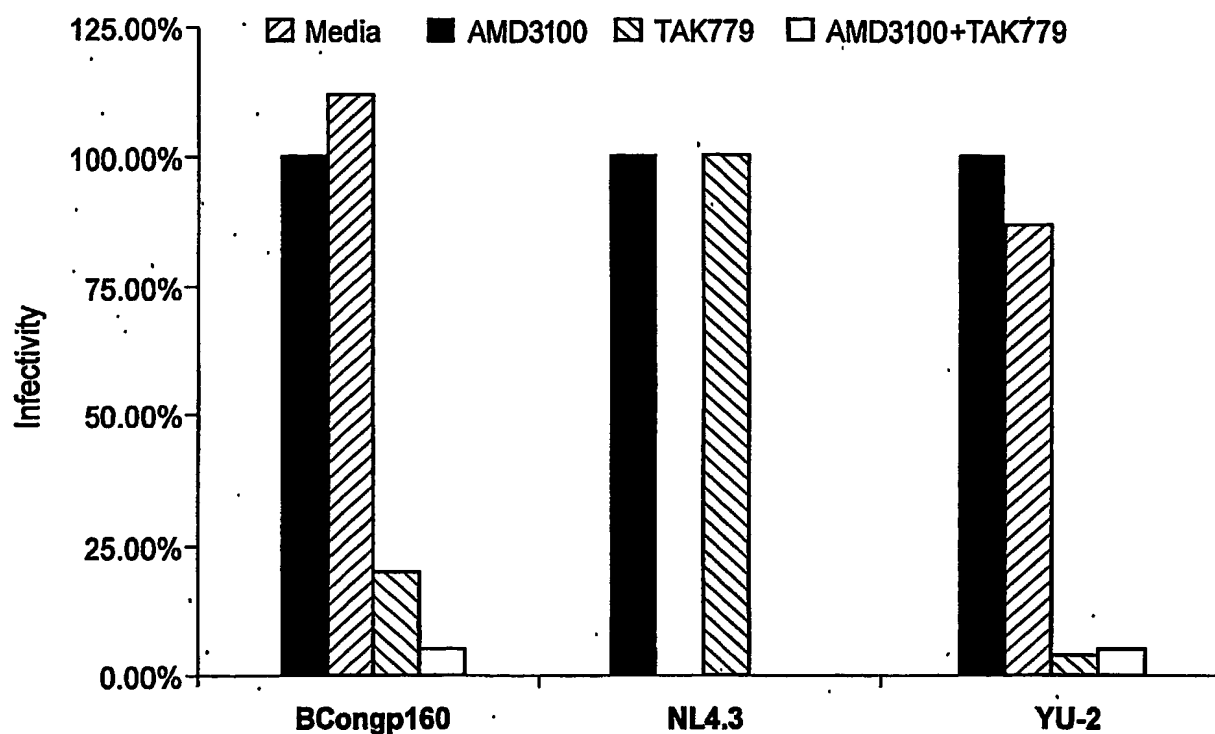
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**Fig. 21**

Expression of subtype B consensus *env* and *gag* genes in 293T cells. Plasmids containing codon-optimized subtype B consensus *gp160*, *gp140*, and *gag* genes were transfected into 293T cells, and protein expression was examined by Western Blot analysis of cell lysates. 48-hours post-transfection, cell lysates were collected, total protein content determined by the BCA protein assay, and 2  $\mu$ g of total protein was loaded per lane on a 4-20% SDS-PAGE gel. Proteins were transferred to a PVDF membrane and probed with serum from an HIV-1 subtype B infected individual.

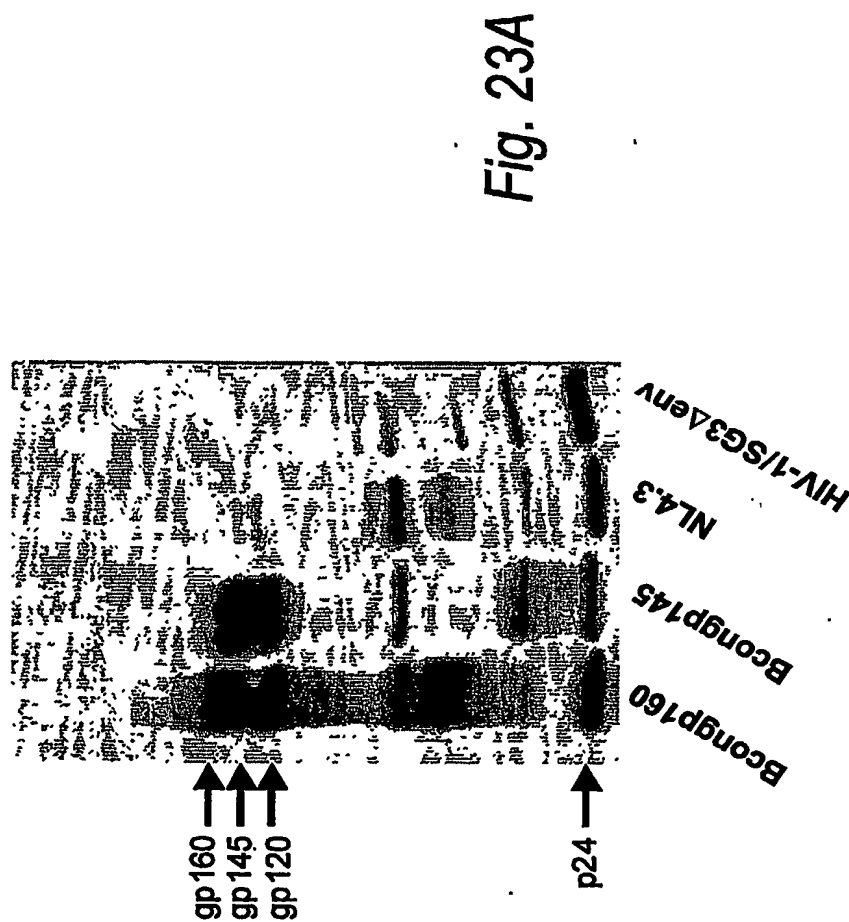


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*Fig. 22***Co-receptor usage of subtype B consensus envelopes.**

Pseudotyped particles containing the subtype B consensus gp160 Env were incubated with DEAE-Dextran treated JC53-BL cells in the presence of AMD3100 (a specific inhibitor of CXCR4), TAK779 (a specific inhibitor of CCR5), and AMD3000+TAK779 to determine co-receptor usage. NL4.3, an isolate known to utilize CXCR4 and YU-2, a known CCR5-using isolate, were included as controls.

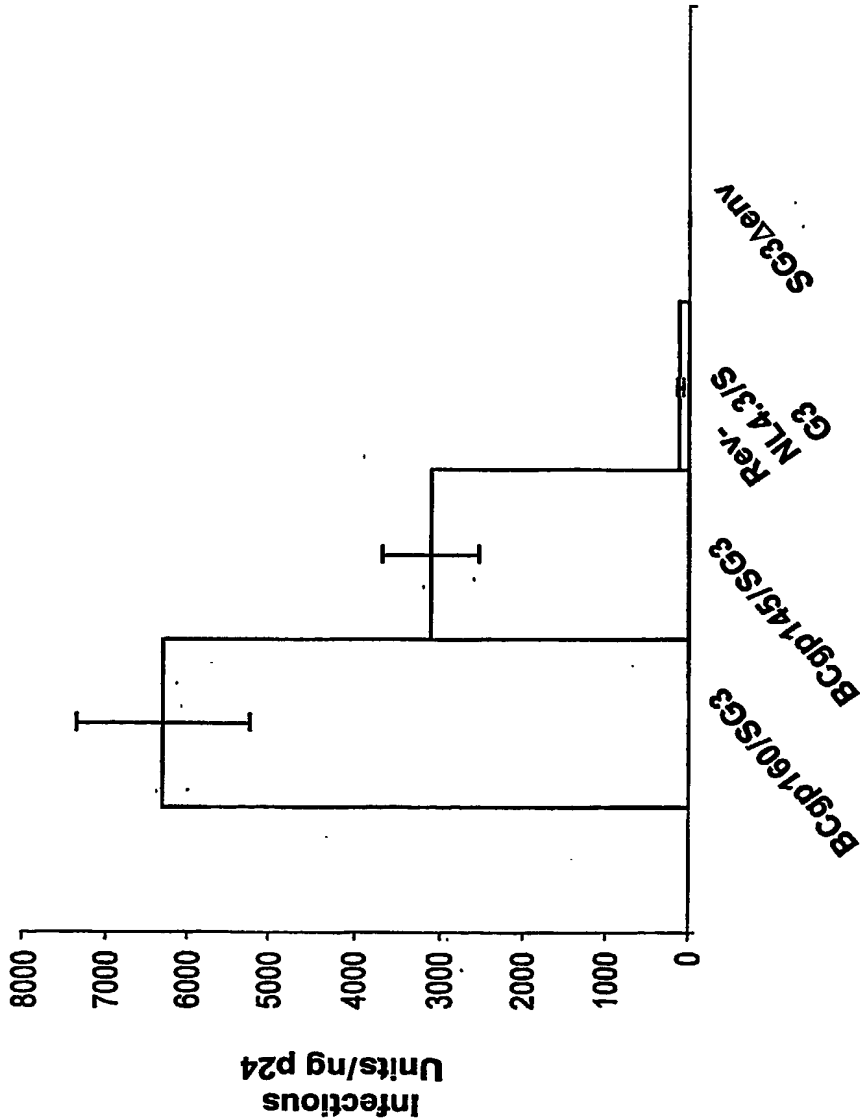
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**Trans complementation of env-deficient HIV-1 with codon-optimized subtype B consensus gp160 and gp140 genes.**

Plasmids containing codon-optimized, subtype B consensus gp160 or gp140 genes were co-transfected into 293T cells with an HIV-1/SG3Δenv provirus. 48-hours post-transfection cell supernatants containing pseudotyped virus were harvested, clarified in a tabletop centrifuge, filtered through a 0.2μM filter, and pellet through a 20% sucrose cushion. Quantification of p24 in each virus pellet was determined using the Coulter HIV-1 p24 antigen assay; 25ng of p24 was loaded per lane on a 4-20% SDS-PAGE gel. Proteins were transferred to a PVDF membrane and probed with anti-HIV-1 antibodies from infected HIV-1 subtype B patient serum. Trans complementation with a rev-dependent NL4.3env was included for control.

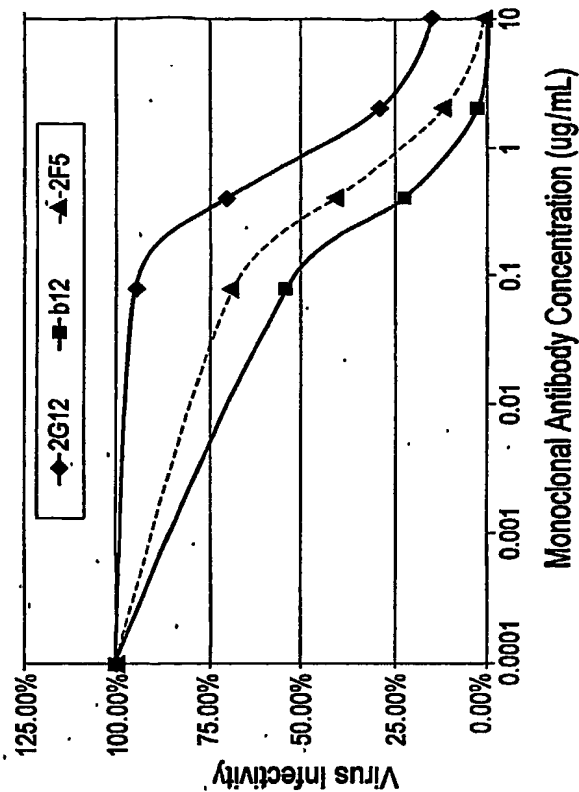
Fig. 23B



Infectivity of virus particles containing the subtype B consensus envelope. Infectivity of pseudotyped virus containing consensus B gp160 or gp140 was determined using the JC53-BL assay. Sucrose cushion purified virus particles were assayed by the Coulter p24 antigen assay, and 5-fold serial dilutions of each pellet were incubated with DEAE-Dextran treated JC53-BL cells. Following a 48-hour incubation period, cells were fixed and stained to visualize  $\beta$ -galactosidase expressing cells. Infectivity is expressed as infectious units per ng of p24.

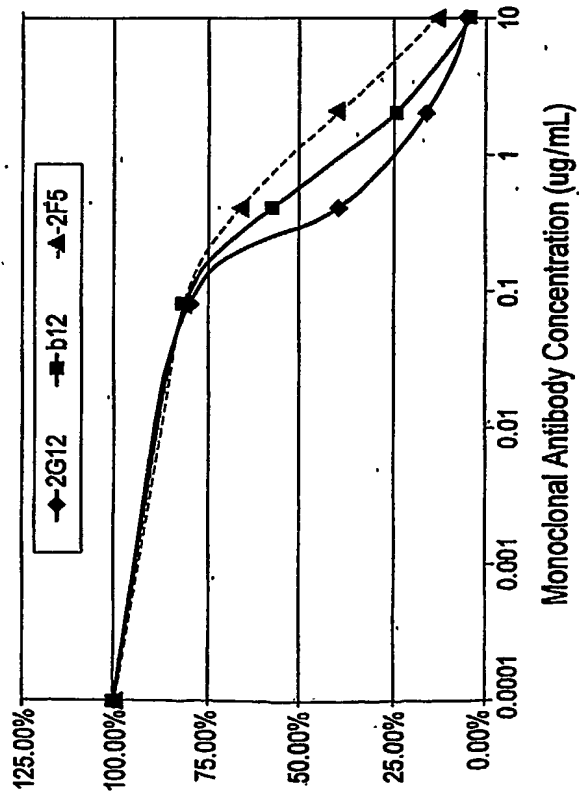
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Fig. 24B



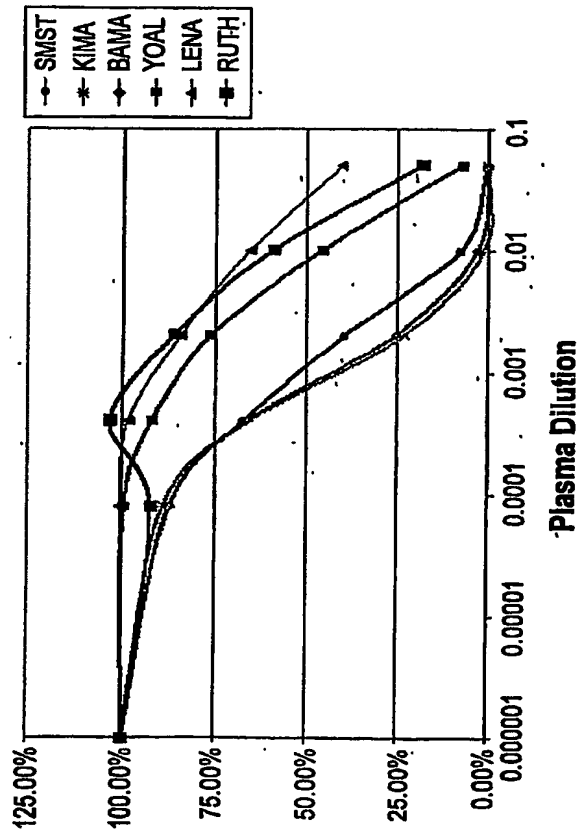
Neutralization of Pseudovirions containing  
NL4.3 Env (gp160)

Fig. 24A



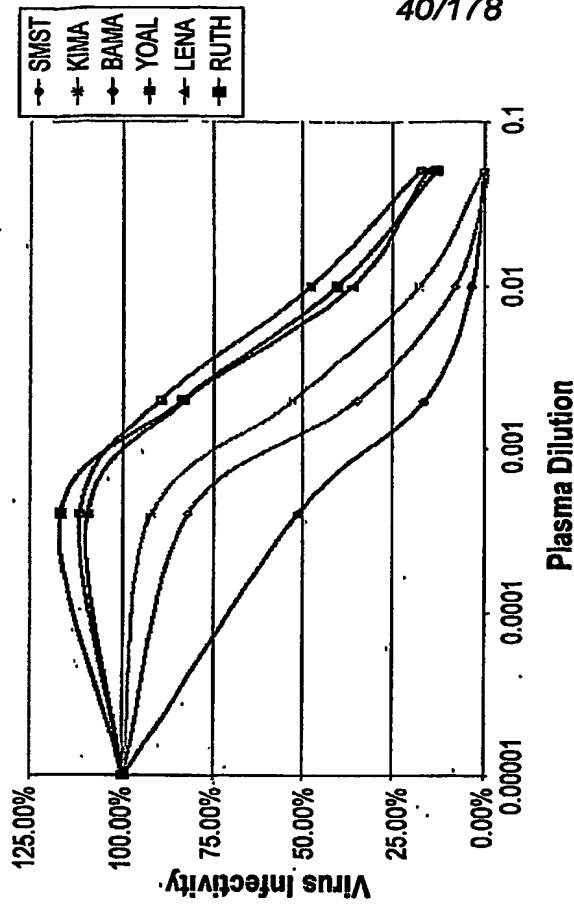
Neutralization of Pseudovirions containing Subtype B  
consensus Env (gp160)

Fig. 24C



Neutralization of Pseudovirions containing Subtype B consensus Env (gp160)

Fig. 24D



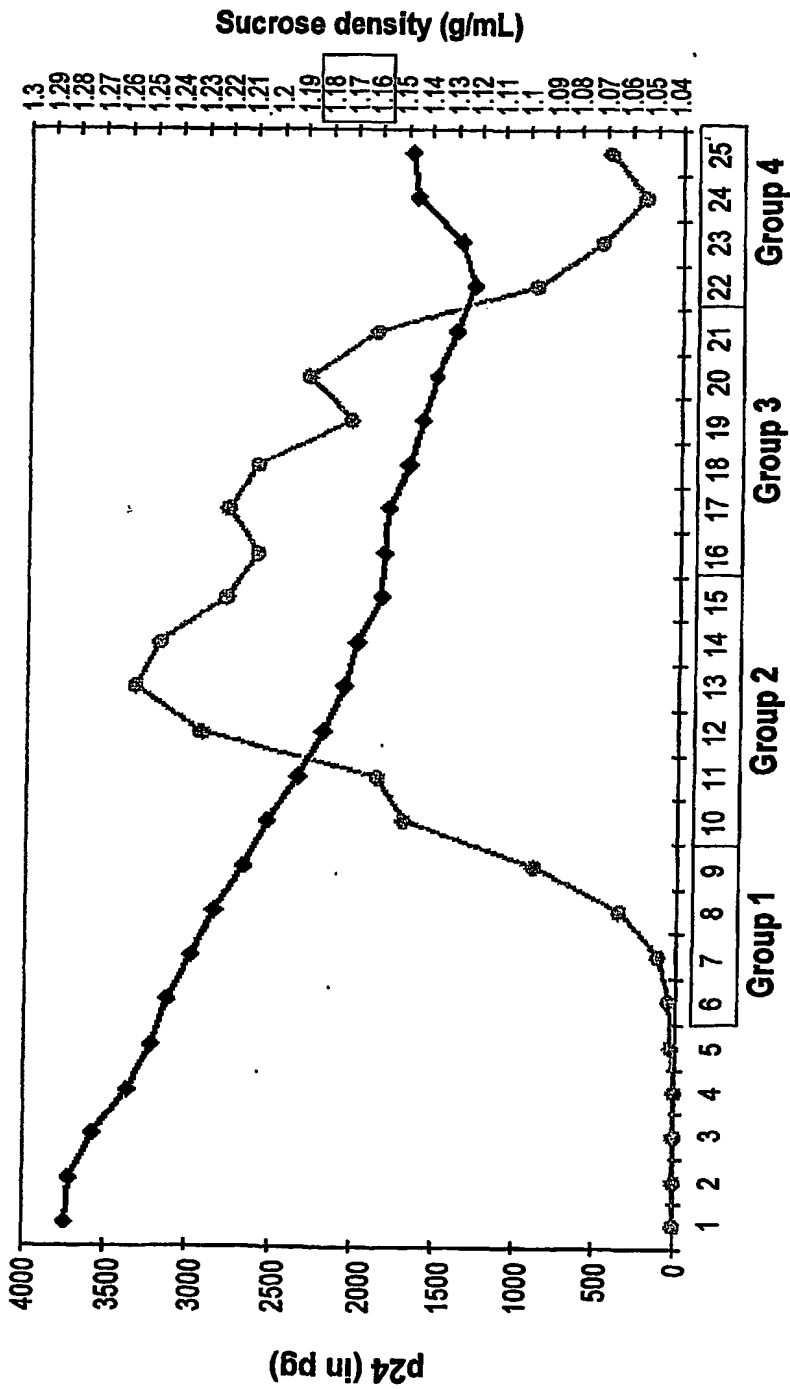
Neutralization of Pseudovirions containing NL4.3 Env (gp160)

### Neutralization sensitivity of virions containing subtype B consensus gp 160 envelope.

Equivalent amounts of pseudovirions containing the subtype B consensus or NL4.3 Env (gp160) (1,500 infectious units) were preincubated with three different monoclonal neutralizing antibodies and a panel of plasma samples from HIV-1 subtype B infected individuals, and then added to the JC53-BL cell monolayer in 96-well plates. Plates were cultured for two days and luciferase activity was measured as an indicator of viral infectivity. Virus infectivity was calculated by dividing the luciferase units (LU) produced at each concentration of antibody by the LU produced by the control infection. The mean 50% inhibitory concentration ( $IC_{50}$ ) and the actual % neutralization at each antibody dilution were then calculated for each virus. The results of all luciferase experiments were confirmed by direct counting of blue foci in parallel infections.

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Fig. 25A

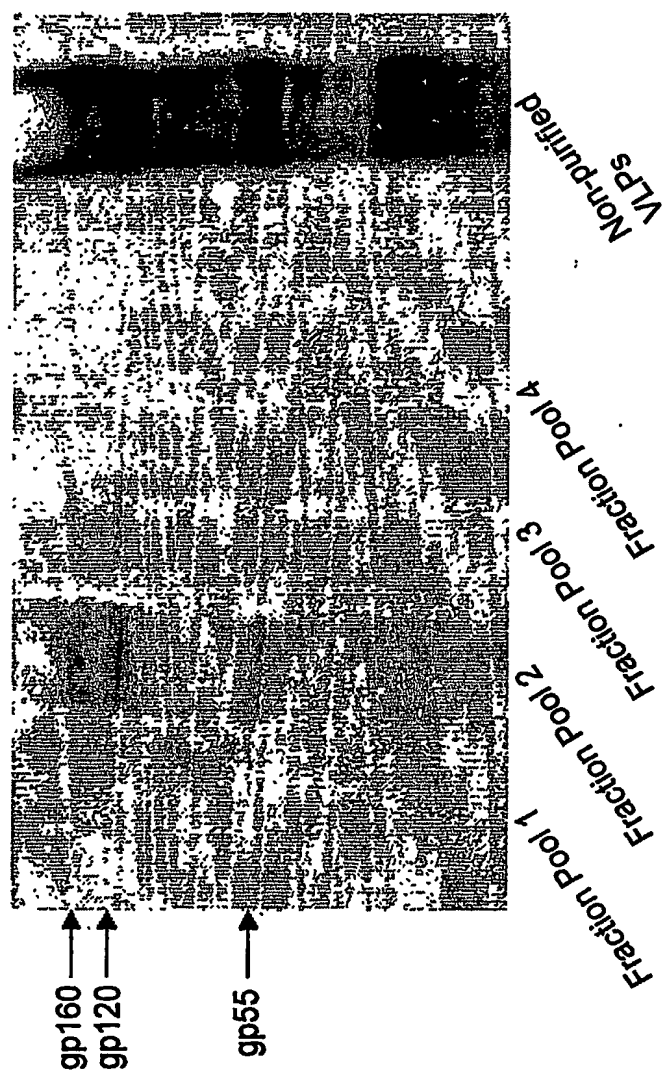


**Density and p24 analysis of sucrose gradient fractions.**

0.5ml fractions were collected from a 20-60% sucrose gradient. Fraction number 1 represents the most dense fraction taken from the bottom of the gradient tube. Density was measured with a refractometer and the amount of p24 in each fraction was determined by the Coulter p24 antigen assay. Fractions 6-9, 10-15, 16-21, and 22-25 were pooled together and analyzed by Western Blot. As expected, virions sedimented at a density of 1.16-1.18 g/ml.

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Fig. 25B



#### VLP production by co-transfection of subtype B consensus gag and env genes.

293T cells were co-transfected with subtype B consensus gag and env genes. Cell supernatants were harvested 48-hours post-transfection, clarified through at 20% sucrose cushion, and further purified through a 20-60% sucrose gradient. Select fractions from the gradient were pooled, added to 20ml of PBS, and centrifuged overnight at 100,000 x g. Resuspended pellets were loaded onto a 4-20% SDS-PAGE gel, proteins were transferred to a PVDF membrane, and probed with plasma from an HIV-1 subtype B infected individual.

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**Fig. 26A****Year 2000 Con-S 140CFI.Env**

MRVIRGIQRNCQHLWRWGTLLGLMLMICSAAENLWVTVYGVVPVWKEANTTLFCASDAKAYDTEVH  
 NVWATHACVPTDPNPQEIIVLENTENFNMWKNMVEQMHEDIISLWDQSLKPCVKLTPLCVTLNC  
 TNVNVNTNTNNTTEEKGEIKNCSFNITTEIRDKKQKVYALFYRLDVVPIDNNNNSSNYRLINCNT  
 SAITQACPKVSFEPIPIHYCAPAGFAILKCNDKKFNGTGPKKNVSTVQCTHGIKPVVSTQLLNG  
 SLAEEELIIRSENIITNNAKTIIVQLNESVEINCTRPNNNTRKSIRIGPGQAFYATGDIIGDIRQA  
 HCNISGTKWNKTLQQVAKKLREHFNNKTIIFKPSSGGDLEITTHSFNCRGEFFYCNTSGLFNSTW  
 IINGTKNNNNNTNDTITLPCRIKQIINMWQGVQAMYPPIEGKITCKSNITGLLLTRDGGNNNTN  
 ETEIFRPGGGDMRDNRSELYKYKVVKIEPLGVAPTAKLTVQARQLLSGIVQQQSNLLRAIEAQ  
 QHLLQLTVWGIKQLQARVLAVERYLKDQQLLEIWDNMTWMEWEREINNYTDIIYSLIEESQNQQEK  
 NEQELLALDKWASLWNWFDITNWLW

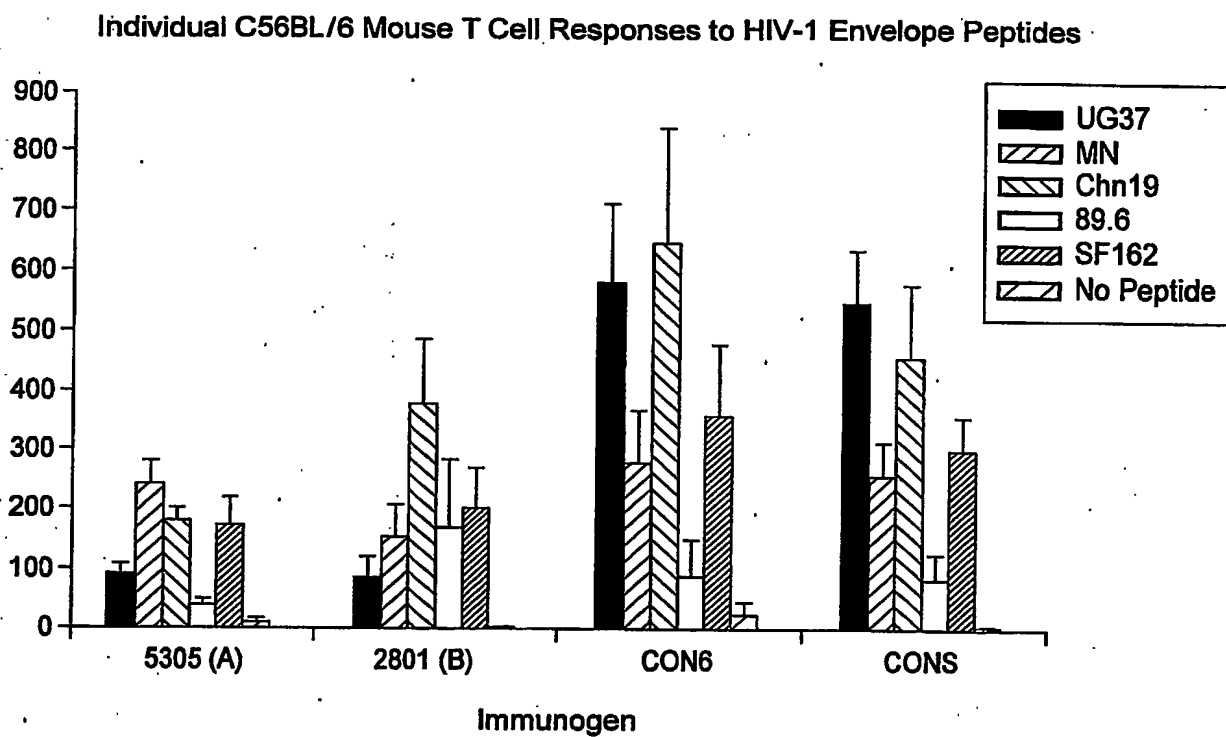
A gp140 CFI is referred to HIV-1 envelope design with the cleavage-site-deleted (C), fusion-site-deleted (F) and gp41 immunodominant region-deleted (I) in addition to the deletion of transmembrane and cytoplasmic domains.

**Fig. 26B****Codon-optimized Year 2000 Con-S 140CFI. seq**

ATGCGCGTGCGCGGCATCCAGCGCAACTGCCAGCACCTGTGGCGCTGGGGCACCCTGATCCTGGG  
 CATGCTGATGATCTGCTCCGCCGCCGAGAACCTGTGGGTGACCGTGACTACGGCGTGCCCGTGT  
 GGAAGGAGGCCAACACCACCCTGTTCTGCGCTCCGACGCCAAGGCCCTACGACACCGAGGTGCAC  
 AACGTGTGGGCCACCCACGCCTGCGTGCCACCGACCCCAACCCCCAGGAGATCGTGCTGGAGAA  
 CGTGACCGAGAACTTCAACATGTGGAAGAACAACATGGTGGAGCAGATGCACGAGGACATCATCT  
 CCCTGTGGGACCAGTCCCTGAAGCCCTGCGTGAAGCTGACCCCCCTGTGCGTGACCCCTGAACCTGC  
 ACCAACGTGAACGTGACCAACACCACCAACAACACCGAGGAGAAGGGCGAGATCAAGAACTGCTC  
 CTTCAACATCACCACCGAGATCCGCGACAAGAAGCAGAAGGTGTACGCCCTGTCTTACC GCCTGG  
 ACGTGGTGCCCATCGACGACAACAACAACACTCCTCCAACCTACCGCCTGATCAACTGCAACACC  
 TCCGCCATCACCAGGCCTGCCCAAGGTGTCTTCGAGCCCATCCCCATCCACTACTGCGCQCC  
 CGCCGGCTTCGCCATCCTGAAGTGCAACGACAAGAAGTTCAACGGCACCGGCCCTGCAAGAACG  
 GTGCCACCGTGCAGTGCAACCCACGGCATCAAGCCCGTGGTGTCCACCCAGCTGCTGCTGAACGGC  
 TCCCTGGCCGAGGAGGAGATCATCATCCGCTCCGAGAACATCACCACAACGCCAAGACCATCAT  
 CGTGCAGCTGAACGAGTCCGTGGAGATCAACTGCACCCGCCCAACAACAACACCCGCAAGTCCA  
 TCCGCATCGGCCCGGCCAGGCCTTCTACGCCACCGGCGACATCATCGGCGACATCCGCGAGGCC  
 CACTGCAACATCTCCGGCACCAAGTGGAACAAGACCTGACAGCAGGTGGCCAAGAAGCTGCGCGA  
 GCACTTCAACAACAAGACCATCATCTTCAAGCCCTCCTCCGGCGGCGACCTGGAGATCACCACCC  
 ACTCCTTCAACTGCCCGGCGAGTTCTTCTACTGCAACACCTCCGGCCTGTTCAACTCCACCTGG  
 ATCGGCAACGGCACCAAGAACAACAACAACACCAACGACACCATCACCTGCCCTGCCGCATCAA  
 GCAGATCATCAACATGTGGCAGGGCGTGGGCCAGGCCATGTACGCCCCCCCCATCGAGGGCAAGA  
 TCACCTGCAAGTCCAACATCACCGGCCCTGCTGCTGACCCGCGACGGCGGCAACAACAACCAAC  
 GAGACCGAGATCTTCCGCCCGGGCGGCGGACATGCGCGACAACCTGGCGCTCCGAGCTGTACAA  
 GTACAAGGTGGTGAAGATCGAGCCCTGGGCGTGGCCCCCACCAGGCCAAGCTTACCGTGCAGG  
 CCCGCCAGCTGCTGTCCGGCATCGTGCAGCAGCAGTCCAACCTGCTGCGCGCCATCGAGGCCAG  
 CAGCACCTGCTGCAGCTGACCGTGTGGGGCATCAAGCAGCTGCAGGCCCGCGTGTGGCCGTGGA  
 GCGCTACCTGAAGGACCAGCAGCTCGAGATCTGGGACAACATGACCTGGATGGAGTGGGAGCGCG  
 AGATCAACAACCTACACCGACATCATCTACTCCTGATCGAGGAGTCCAGAACAGCAGGAGAAG  
 AACGAGCAGGAGCTGCTGGCCCTGGACAAGTGGGCCTCCCTGTGGAACCTGGTTCGACATCACCAA  
 CTGGCTGTGGTGAGGATCC



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**Fig. 27**

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**Fig. 28A****Design of expression-optimized HIV-1 envelope gp140CF****Con-B-2003 Env.pep (841 a.a.)\***

MRVKGIRKNYQHLWRWGTMLLGMLMICSAAEKLWVTYYGVVPVWKEATTTLCASDAKAYDTEVHNVWATHACVPTDPNPQEVVL  
 ENVTFENFMWKNMVEQMHEDIISLWDQSLKPCVKLTPLCVTLNCTDLMNATNTNTTIIYRWGEIKNCSEFNITTSIRDQVQKEY  
 ALFYKLDVVPIDNDNTSYRLISCNSTSVITQACPKVSFEPIPIHYCAPAGFAILKCNDDKFKNGTGPCNTNVSTVQCTHGIRPVVSTQ  
 LLLNGSLAEVEEVIRSENFTDNAKTIIVQLNESVEINCTRPNNTRKSIHIGPGRAFTTGEIIGDIRQAHNCISRAKWNNTLKQ  
 IVKKLREQFGNKTIVFNQSSGGDPEIVMHSFNCGGEFFYCNTTQLFNSTWNGTWNTEGNTILPCRIKQIINMWQEVGKAMYAPP  
 IRGQIRCSSNITGLLLTRDGGNNETEIFRPGGDMRDNRSELYKYKVVKIEPLGVAPTAKRRVVQREKRAVGIGAMFLGELGA  
 AGSTMGAASMTITVQARQLLSGIVQQNNLLRAIEAQHLLQLTWVGIKQLQARVLAVERYLKDQQLLGIWGC SGKLICTTAVPW  
NASWSNKSLDIEWDNMTWMEWEREIDNYTSLIYTLIEESONQOEKNEQELLELDKWSLWNWFDITNWLWYIKIFIMIVGGLVGL  
 RIVFAVLISIVNRVQGYSPLSFQTRLPAAPRGDRPEGIEEGGERDRSGRLVDGFLALIWDDLRLSLCLFSYHRLRDLILLIVTR  
 IVELLGRRGWEVLKYWNLLQYWSQELKNSAVSLLNATAIAVAEGTDRVIEVVQACRAILHIPRRIRQGLERALL

\*Amino acid sequence underlined is the fusion domain that will be deleted in 140CF design and the "W" underlined with red color is the last amino acid at the C terminus, and all the remaining amino acids after the "W" will be deleted in 140CF design.

**Fig. 28B****Con-B-140CF.pep (632 a.a.)****Nick name: 002**

MRVKGIRKNYQHLWRWGTMLLGMLMICSAAEKLWVTYYGVVPVWKEATTTLCASDAKAYDTEVHNVWATHACVPTDPNPQEVVL  
 ENVTFENFMWKNMVEQMHEDIISLWDQSLKPCVKLTPLCVTLNCTDLMNATNTNTTIIYRWGEIKNCSEFNITTSIRDQVQKEY  
 ALFYKLDVVPIDNDNTSYRLISCNSTSVITQACPKVSFEPIPIHYCAPAGFAILKCNDDKFKNGTGPCNTNVSTVQCTHGIRPVVSTQ  
 LLLNGSLAEVEEVIRSENFTDNAKTIIVQLNESVEINCTRPNNTRKSIHIGPGRAFTTGEIIGDIRQAHNCISRAKWNNTLKQ  
 IVKKLREQFGNKTIVFNQSSGGDPEIVMHSFNCGGEFFYCNTTQLFNSTWNGTWNTEGNTILPCRIKQIINMWQEVGKAMYAPP  
 IRGQIRCSSNITGLLLTRDGGNNETEIFRPGGDMRDNRSELYKYKVVKIEPLGVAPTAKRTLTVQARQLLSGIVQQNNLLRA  
IEAQHLLQLTWGIKQLQARVLAVERYLKDQQLLGIWGC SGKLICTTAVPWNASWSNKSLEIDWNMTWMEWEREIDNYTSLIY  
 TLIEESONQOEKNEQELLELDKWSLWNWFDITNWLW\*

\*Amino acids seen in blue color is for easy identification of the junction of the deleted fusion cleavage site.

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**Fig. 28C****Codon-optimized Con-B 140CF.seq (1927 nt.)****Nick name: 002**

TTCAGTCGACGGCCACCATGAGGGTGAAGGTATTCGGAATAATTACCAACACCTGTGGCGTGGGAACCATGCTCCTTGGTAT  
 GCTGATGATTGTCAGTGCCTGCGGCGAGAACTTTGGTAACCTGTGTACTACGGCGTTCTGTCTGGAAGGAAGCTACAACCACTCTT  
 TTTTGTGCATCCGACGCTAAAGCTTACGACACAGAAGTGCATAATGTTGGGCCACCCATGCTTGGTCCCTACAGATCCCAACC  
 CCCAGGAAGTCGTCTTGAGATGTCACAGAGAAATTTAACATGTGAAGATAATATGTTAGAACAAATGCACGAAGACATTAT  
 TAGCCTGTGGACCGTCCCTTGAAGCCCTGCGTGAACCTCACTCCACTTTCGCTCACACTTAACCTGACTGATTTGATGAACGCA  
 ACCAACACAAATACTACTATTATATATATCGCTGGAGGGGGAATCAAGAACTGCTTTCAACATCACCACTTCCATAAGGGATA  
 AGTCCAGAAAGAATATGCCCTGTTTATAAACTTGATGTGTCGGATAGACAATGACAACACTAGCTATCGACTGATCTCTTG  
 TAACACATCCGTGATTACCCAAAGCTTGCCCAAGGTGAGCTTTGAACCAATACCCATTCACCTACTGCGCTCCGCTGGTGTG  
 ATCCTCAAGTGTACGACAAAAAATTCATGGGACCGGACCTTGACACAAACGTGTCCACCGTCAATGTACTCACGGAATCAGAC  
 CTGTTGTCAGTACCCAACTCCTTGAACGGGTCTCTCGGGAAGAGGAGGTGCTGATTAGAAGCGAAACTTTACCGATAACGC  
 TAAACAATCATTTGTGCAACTTAATGAAGCTCGAAATTAACCTGACCCAGACCAACAAATAATACCAAGAAATCTATTACATA  
 GGGCCCGCGCGCATTTTATACAACCTGGCGAAATCATTTGTCATCAGACAAAGCTCATTTGCAATATCTCCGCGGAAATGGA  
 ACAACACCCCTGAACAGATCGTGAAGAACTTCGAGAACAAATTCGTAATAAACAATCGTATTCACCAAGCTCCGGAGGCGA  
 CCTGAGATAGTTATGCACTCATTTCACTGTGGCGGAGTCTTCTATTGTAAACAACTCAACTTTTAAATAGCACTTGGAAAT  
 GGAACATGGAACAACACAGAGGGAACATCACTTGCCTTGTGCGATTAAAGCAGATCATTAAATATGTGGCAAGAGTGGGAAAG  
 CTATGTACGCCCCCTATTTCGCGGACAAATAAGATGCTCTAGTAATATTACCGGATTGTTGCTGACACGCGGAGGAAATAA  
 TGAACAGAGATATTAGACCTGGCGGAGCGGACATGAGAGATAACTGGAGAAAGTGAAGCTTTACAAATAATAAGTCGTAAGATA  
 GAACCATTTGGGGTAGCACCAACCAAGCAAAACCTTGACAGTACAGGCTAGGCAGCTGCTGAGCGGAATCGTGCAACACAAA  
 ATAACTTCTCCGAGCCATAGAGACAAACACATCTGTTGAGCTGACAGTATGGGGAATCAACAGCTTCAGGCAAGAGTGCT  
 GGCGCTCGAGAGATACCTCAAAGATCAACAACTGCTGGGCATATGGGATGTTCCGGTAAACTCATATGCACTACCGCCGTGCCC  
 TGGAACGCGAGCTGGTCTAATAATCCCTGGATGAATTTGGGACACATGACTTGGATGGAATGGGAACGSGAAATTGACAACT  
 ATACTAGTTTGATTTATACTCTGATCGAAGAACTTCAGAACCAACAGGAGAAACCGAACAGGAACTGCTGGAACCTGGACAAGTG  
 GGCATCATTTGTGGAACCTGTTGACATTACTAACTGGCTGTGGTAAAGATCTTACAA

(For all 140CF design shown here and below, 140CF gene will be flanked with the 5' sequence of "TTCAGTCGACGGCCACC" that contains a Kozak" sequence (GCCACCATGG/A) and SalI site and 3' sequence of TAAAGATCTTACAA containing stop codon and BglII site.)

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Fig. 29A

CON OF CON-S-2003 (829 a.a.)

MRVMGIQRNCQHLWRWGILIFGMLIICSAENLWVTYYGVVPWKEANTTLFCASDAKAYDTEVHNWVWATHACVPTDPNPQEIVL  
 ENVTFENFMWKNMVEQMHEDIISLWDQSLKPCVKLTPLCVTLNCTDVNATNTNNEEIKNCSEFNTTEIRDKKKVYALFYKL  
 DVVPIDDDNNSYRLINCNNTSAITQACPKVSFEPIPIHYCAPAGFAILKCNDKKFNGTGPCKNVSTVQCTHGKIPVSTQLLNGSL  
 AEEELIIRSENITNNAKTIIVQLNESVEINCTRPNNNTRKSIRIGPGQAFYATGDIIGDIRQAHCNISRTKWNKTLOQVAKKLRE  
 HFNKTIIFNPSSGGDLTTHSFNCGGEFFYCNTESEFNSTWNGTNTITLPCRIKQIINMWQGVQAMYPPIEGKIRCTSNIT  
 GLLLTRDGGNNNTETFRPGGDMRDNRSELYKYKVVKIEPLGVAPTAKRRVVEREKRAVGIGAVFLGFLGAAGSTMGAASITL  
 TVQARQLLSGIVQQSNLLRAIEAQHLLQLTVWGIKQLOARVLAVERYLKDQQLIGWCSGKLICTTNVPWNSSWSNKSQDEI  
 WDNMTWMEWDKEINNYTDIISLYEESQOQKEQELLALDKWASLWNWFDITNWLWYKIFIMIVGGLIGLRIVFAVLSIVNR  
 VRQGYSPLSFQTLIPNPRGPDREGIEEGEQDRDRSIRLVNGFLALAWDDLRLSLCLFSYHRLRLDLILIAARTVELLGRRGWEA  
 LKYLWNLQYWGQELKNSAISLLDTAIAVAEGTDRIEVVQVRCRAILNIPRRIRQGFERALL

\*Amino acid sequence underlined is the fusion domain that will be deleted in 140CF design and the "W" underlined with red color is the last amino acid at the C terminus, and all the remaining amino acids after the "W" will be deleted in 140CF design.

Fig. 29B

CON-S-2003 140CF.pep (620 a.a.).

Nick name: 006

MRVMGIQRNCQHLWRWGILIFGMLIICSAENLWVTYYGVVPWKEANTTLFCASDAKAYDTEVHNWVWATHACVPTDPNPQEIVL  
 ENVTFENFMWKNMVEQMHEDIISLWDQSLKPCVKLTPLCVTLNCTDVNATNTNNEEIKNCSEFNTTEIRDKKKVYALFYKL  
 DVVPIDDDNNSYRLINCNNTSAITQACPKVSFEPIPIHYCAPAGFAILKCNDKKFNGTGPCKNVSTVQCTHGKIPVSTQLLNGSL  
 AEEELIIRSENITNNAKTIIVQLNESVEINCTRPNNNTRKSIRIGPGQAFYATGDIIGDIRQAHCNISRTKWNKTLOQVAKKLRE  
 HFNKTIIFNPSSGGDLTTHSFNCGGEFFYCNTESEFNSTWNGTNTITLPCRIKQIINMWQGVQAMYPPIEGKIRCTSNIT  
 GLLLTRDGGNNNTETFRPGGDMRDNRSELYKYKVVKIEPLGVAPTAKTLTVQARQLLSGIVQQSNLLRAIEAQHLLQLTV  
 WGIKQLOARVLAVERYLKDQQLIGWCSGKLICTTNVPWNSSWSNKSQDEIWDNMTWMEWDKEINNYTDIISLYEESQOQKE  
 NEQELLALDKWASLWNWFDITNWLW\*

\*Amino acids seen in blue color is for easy identification of the junction of the deleted fusion cleavage site.

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## Fig. 29C

CODON-OPTIMIZED CON-S-2003 140CF.seq (1891 nt

Nick name :006

TTCAGTCGACAGCCACCACCATGCGGTGTCATGGGATACAGAGGAATTGCCAGCACTGTGGAGTGGGAATTTTGATATTCGGGAT  
 GCTCATAATCTGCTGCGGCTGAGAACCTGTGGTCACTGTGTATTACGGCGTTCCTGCTGGAAAGAAGCTAATACTACCTG  
 TTTGTGCAAGCGAGCCCAAGCATACGACACCGAAGTCCACAATGTCTGGCTACCCACGCTGTGTACTGTATCCAAATC  
 CCCAGGAAATTGTTCTTGAAAACGTAAACGGAAAACCTTAAACATGTGGAAGAATAATATGTTGGAGCAATGCACGAGGATATAAT  
 CAGCCTGTGGGACAGTCCCTCAAAACCATGCGTTAACTCACTCCACTCTGCGTGACTCTGAACGTGTACCGACGTGAACGCAACC  
 AATAATACAACAAACAATGAGGAGATAAAGAATTGTTCAATTAATATAACCACTGAGATACGGGATAAGAAAAGGTTTATG  
 CACTCTTTTACAAGCTCGACGTGGTGCCCATAGACGACAATAATAGCTACCGACTCAATTAATTGCAATACTAGCGCTATAACCCA  
 GGCATGCCCCAAAGTTTCCTTCGAGCCCATACCGATTCACTACTGCGCACCCCGCGGATTGCGCATTTCTAAATGCAATGACAAG  
 AAGTTCAACGGCACCGGACCCCTGTAAGAAGAGATCATTATCAGGTACAGATAATCACTAACACGCGAAACAATCATTTGTTCACT  
 TCCTCAACGGGAAGCCTTGCAAGAAGAGATCATTATCAGGTACAGAAAATATCACTAACACGCGAAACAATCATTTGTTCACT  
 GAATGAGTCTGTAGAAATCAATTGTACCCGCCCTAATAATAACAAGAAAGTCAATTAGGATCGGACCCGCGGCTTTCTAC  
 GCAACCGGAGATATCATCGGGATATACGACAGGCCCATGCAACATTTCTAGAACTAAGTGAATAAACTTTGCAGCAGGTAG  
 CCAAGAAACTCGGGAAACATTTTAATAAGACAATCATCTTCAATCCAAGTAGCGGAGGGACCTGGAAATCACTACACATTCCTT  
 TAACTGTGGGGCGAGTTTCTACTGTAATACCTCTGAACGTGTTCAACTCAACATGGAATGGCACTAACATACTATAACTCTT  
 CCTTGCAGATAAACAAGATTATCAACATGTGGCAGGTGTGGGCAAGCAATGTATGCACCAACCAATCGAAGGCGGCGGATAT  
 GCACCTCCAATATTACCGGACTCCTCTGACACGGGATGGGAAACAATAACACGAGACCTTTAGCCAGGCGGCGGATAT  
 GAGATAAATGCGGCTCCGAGCTCTATAAATAACAAGTCGTTAGATCGAGCCCTTGGAGTTGCGCAACCAAGCTAAAACC  
 TTGACCGTGCAAGCCAGGAGTTGTTGTGAGGTATCGTACAGCAGCAATCTAATCTTTTGAGAGCCATTGAGGCTCAGCAGCACC  
 TCTTGACGCTTACCGTCTGGGCGATCAAAACAATTCAGGCACGCTCCTGGCCGTAGAGCGCTATTTGAAGACCAACTTCT  
 CGGGATCTGGGGTGTCTGGAAAATTGATCTGCAGACAATGTGCTTGGACACAGCAGCTGGTCAAATAAAGCCAGACGAA  
 ATATGGGATAACATGACATGGATGGAATGGGATAAAGAAATTAATAATTACACTGACATTATTTACTCACTTATCGAGGAATCAC  
 AAAATCAACAGGAAAAAATGAACAGGAACCTTTGGCTCTGGACAAATGGGCTTCACTGTGGAACCTGGTTCGACATCACAAATTG  
 GCTCTGGTAAAGATCTTACAA

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Fig. 30A

**CONSENSUS A1-2003 (845 a.a.)**

MRVMGIQRNCQHLLRWGTMILGMIICSAAENLWVTYYGVPVWKDAETTLFCASDAKAYETEMHNWVWATHACVPTDPNPQEIHL  
 ENVTEEFNMWKNMVEQMHTDIIISLWDQSLKPCVKLTPLCVTLNCSNVNVTNNTTNTTHEEIKNCSFNMTTELDRDKKQKVSLEY  
 RLDVVQINENNSNRYRLINCNTSAITQACPKVSFEPIPIHYCAPAGFAILKCKDKEFNGTGPKCNVSTVQCTHGKIPVSTQLL  
 LINGSLAEVEEVIIRSENITNNAKTIIVQLTKPVKINCTRPNNTRKSIRIGPGQAFYATGDIIGDIRQAHNCVSRSEWNKTLOKVA  
 KQLRKYFKNKTIIFTNSSGGDLEITTHSFNCGGEFFYCNTSGLFNSTWNGTMKNTITLPCRKQIINMWQAGQAMYAPPIQGV  
 IRCESNITGLLLTRDGGNNNTNETFRPGGDMRDNRSELYKYKVVKIEPLGVAPTRAKRRVVEREKRAVGIGAVFLGFLGAAGS  
 TMGAASITLVQARQLLSGIVQQSNLLRAIEAQOHLKLTVMGKIQLOARVLAVERYLKDQQLLGIWGCSGKLICTTNVPWNSS  
WSNKSQNEIWDNMTWLQWDKEISNYTHIIYNLIEESQOQEKNEQDLLALDKWANLWNWFDISNWLWYIKIFIMIVGGLIGLRIV  
 FAVLSVINRVQGYSPLSFQTHTPNPRGLDRPGRIEEGEGQGRDSIRLSVSGFLALAWDDLRLSLCLFSYHRLRDEILIAARTVE  
 LIGHSSLKGLRLGWEGLYLWNLWLLYWGRELKISAINLVDTIAIAGWTDRIEIGQIRAILHIPRRIRQGLERALL

\*Amino acid sequence underlined is the fusion domain that will be deleted in 140CF design and the "W" underlined with red color is the last amino acid at the C terminus, and all the remaining amino acids after the "W" will be deleted in 140CF design.

Fig. 30B

**Con-A1-2003 140CF.pep (629 a.a.)****Nick name: 001**

MRVMGIQRNCQHLLRWGTMILGMIICSAAENLWVTYYGVPVWKDAETTLFCASDAKAYETEMHNWVWATHACVPTDPNPQEIHL  
 ENVTEEFNMWKNMVEQMHTDIIISLWDQSLKPCVKLTPLCVTLNCSNVNVTNNTTNTTHEEIKNCSFNMTTELDRDKKQKVSLEY  
 RLDVVQINENNSNRYRLINCNTSAITQACPKVSFEPIPIHYCAPAGFAILKCKDKEFNGTGPKCNVSTVQCTHGKIPVSTQLL  
 LINGSLAEVEEVIIRSENITNNAKTIIVQLTKPVKINCTRPNNTRKSIRIGPGQAFYATGDIIGDIRQAHNCVSRSEWNKTLOKVA  
 KQLRKYFKNKTIIFTNSSGGDLEITTHSFNCGGEFFYCNTSGLFNSTWNGTMKNTITLPCRKQIINMWQAGQAMYAPPIQGV  
 IRCESNITGLLLTRDGGNNNTNETFRPGGDMRDNRSELYKYKVVKIEPLGVAPTRAKTLTVQARQLLSGIVQQSNLLRAIEA  
QOHLKLTVMGKIQLOARVLAVERYLKDQQLLGIWGCSGKLICTTNVPWNSSWSNKSQNEIWDNMTWLQWDKEISNYTHIIYNLI  
EESQOQEKNEQDLLALDKWANLWNWFDISNWLW\*

\*Amino acids seen in blue color is for easy identification of the junction of the deleted fusion cleavage site.

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**Fig. 30C****CODON-OPTIMIZED Con-A1-2003.seq****Nick name: 001 (1918 nt)**

TTCAGTCGACAGCCACCATGAGGGTGATGGGAATCCAACGGAACGCCAGCATCTTCTCCGGTGGGAAACGATGATCTGGGAAT  
 GATAATAATCTGCTCTGCCGCTGAAAACCTCTGGGTCACAGTGTAACGGAGTGCCCTGTATGGAAGGACGCTGAAACCACTCTC  
 TTTTGTGCTTCCGATGCTAAAGCTACGAAACCGAGATGCACAATGTTTGGGCCACCCACGCTGCGTGCCAACTGATCCTAATC  
 CACAAGAAATACATCTGGAGATGTTACTGAGGAATTTAACATGTGGAATAATAATATGTTAGAGCAAAATGCACACTGACATCAT  
 TTCACCTCTGGGACCAATCACTCAAAACCTGCGTTAAACTTACCCCTCTGCGTGACCCCTCAATTGTAGCAACGTCAACGTCAACA  
 AATAATACAACCAACACTCACGAGGAAGAAATTAAAAATGCTCCTTTAATATGACCCTGAACCTTCCGACAAAACAAAAAG  
 TCTATTCACTGTTTTATAGGCTGGACGTCGTCCAATCAACGAGAACAAATCTAACAGTAGCTATCGACTTATCAATTGCAATAC  
 CTCGTCTATTACCCAGCTTGTCTTAAGTCTCTTTGAACCAATCCCTATCCACTACTGTGCCCCAGCTGGATTGCAATTCTG  
 AAGTCAAGGATAAGGAATTCAACGGAACCTGGCCCTTGCAAGAACGTTAGCACTGTCCAATGCACTCAGGAAATCAACCCAGTAG  
 TCAGCACTCAACTGCTCCTGAATGGCTCACTCGCCGAAGAGGTTATCCGAAGCCGAGAACATACTAACCAATGCGAAGAC  
 AATAATTGTTCAATTGACGAAACCCAGTGAAGATCAACTGTACTAGACCAATAACACAGAAATCTATCAGAAATTTGGCCCC  
 GGACAAAGCCTTCTACGCAACAGGAGATATCATAGGTGACATCAGACAGGCCCATTTCAACGTTTCAAGAAAGCGAGTGAATAAAA  
 CACTCCAGAAAGTGGCAAGCAGCTGAGAAATACTTTAAGAACAGACAATCATATTTACTAACTCCTCCGGAGGTGATCTCGA  
 AATAACCACTCATAGCTTTAATTGTGGGGCGCAATTCTTCTACTGTAACACATCTGGCCTCTTTAATTCTACCTGGAATAACGGC  
 ACCATGAAAAATACTATCACCTCCCTTGCAGAAATTAAGCAATCATTAACATGTGGCAGAGCAGGACAGGCCATGTATGCCC  
 CTCCCATTCAGACCCCGCGGCGATATCGATGTAAAGCAACATTAAGCAATCATTAACATGTGGCAGAGCAGGAAATAATAACCAATGA  
 GACATTCAGACCCCGCGGCGATATCGAGACAAATTTGGCGAAGTGAACCTTATAAATACAAAGTAGTTAGATTGAGCCCCCTT  
 GGAGTTGCCCTACTFAGAGCAAAAACATCTCTTGAATTTGACCCGTATGGGCAATCAAGCAATTCAGAGGTAGGTTTTGGCTGTGGA  
 TCCGAGCTATCGAGGCACAACACATCTCTTGAATTTGACCCGTATGGGCAATCAAGCAATTCAGAGGTAGGTTTTGGCTGTGGA  
 ACGCTATCTCAAGGATCAGCAGCTTCTGGGAATCTGGGATGCTCTGGGAATTTGATATGTACTACAAACGTTACCCCTGGAACTCA  
 AGCTGGAGTAATAAAGCCAGAACGAAATTTGGGATAATATGACCTGGCTGCAGTGGGACAAAGAAATTTCTAATTATACATATA  
 TCATATACAATCTGATCGAAGAAATCACAGAACCCAGGAAAGAAATGAGCAAGACCTTCTGGCCTTGGACAAAGTGGGCTAACTT  
 GTGGAACCTGGTTTGACATTAGCAACTGGCTGTGGTAAAGATCTTACAA

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Fig. 31A

**CONSENSUS C-2003 (835 a.a.)**

MRVGRILRNCCQWIIWGILGFWMIMCNVVGNLWVTYYGVVWKEAKTTLFCASDAKAYEKEVHNWVWATHACVPTDPNPQEIVL  
 ENVTEFNFMWKNDMVDQMHEDIISLWDQSLKPCVKLTPLCVTLNCTNATNTMGEIKNCSENIITELRDKKQKVYALFYRLDI  
 VPLNENNSYRLINCNNTSAITQACPKVSFDPIPIHYCAPAGYAILKCNKNTFNGTGPCNNVSTVQCTHGKIPVSTQLLLNGSLAE  
 EEIIIRSENLTNNAKTIIIVHLNESVEIVCTRPNNNTRKSIRIGPGQTFYATGDIIGDIRQAHCNISEDKNWKTLOKVSKKLKEHF  
 PNKTIKFEPSGGDLEITTHSFNCRGEFFCYNTSKLFNSTYNSTNTITLPCRKQIINMWQEVGRAMYAPPIAGNITCKSNITG  
 LLLTRDGGKNNTEFRPGGDMRDNRSELYKYKVVVEIKPLGIAPTAKRRVVEREKRAVGIGAVFLGLGAAGSTMGAASITLT  
 VQARQLLSGIVQQSNLLRAIEAQHMLQLTVWGIKOLOTRVLAIERYLKDOQLIGWCSGKLICTTAVPWNSSWSNKSQEDIW  
 DNMTWMQWDREISNYTDTIYRLLEDSONQOEKNEKDLLALDSWKNLWNWFDITNWLWYIKIFIMIVGGLIGLRIIFAVLSIVNRV  
 RQYSPLSFQTLTPNPRGPDRLGRIEEEGEQDRDRSIRLVSGFLALAWDDLSICFSYHRLRDFILIAARAVELLGRSSLRGL  
 QRGWEALKYLGSLVQYWGLELKKSAISLLDTIAIAVAEGTDRIIELIQICRAIRNIPRRIRQGEAALQ

\*Amino acid sequence underlined is the fusion domain that will be deleted in 140CF design and the "W" underlined with red color is the last amino acid at the C terminus, and all the remaining amino acids after the "W" will be deleted in 140CF design..

Fig. 31B

**Con-C 2003 140CF.pep (619 a.a.)****Nick name: 003**

MRVGRILRNCCQWIIWGILGFWMIMCNVVGNLWVTYYGVVWKEAKTTLFCASDAKAYEKEVHNWVWATHACVPTDPNPQEIVL  
 ENVTEFNFMWKNDMVDQMHEDIISLWDQSLKPCVKLTPLCVTLNCTNATNTMGEIKNCSENIITELRDKKQKVYALFYRLDI  
 VPLNENNSYRLINCNNTSAITQACPKVSFDPIPIHYCAPAGYAILKCNKNTFNGTGPCNNVSTVQCTHGKIPVSTQLLLNGSLAE  
 EEIIIRSENLTNNAKTIIIVHLNESVEIVCTRPNNNTRKSIRIGPGQTFYATGDIIGDIRQAHCNISEDKNWKTLOKVSKKLKEHF  
 PNKTIKFEPSGGDLEITTHSFNCRGEFFCYNTSKLFNSTYNSTNTITLPCRKQIINMWQEVGRAMYAPPIAGNITCKSNITG  
 LLLTRDGGKNNTEFRPGGDMRDNRSELYKYKVVVEIKPLGIAPTAKTTLTVQARQLLSGIVQQSNLLRAIEAQHMLQLTVW  
 GIKQLQTRVLAIERYLKDOQLIGWCSGKLICTTAVPWNSSWSNKSQEDINDNMTWMQWDREISNYTDTIYRLLEDSONQOEKN  
 EKOLLALDSWKNLWNWFDITNWLW\*

\*Amino acids seen in blue color is for easy identification of the junction of the deleted fusion cleavage site.



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## Fig. 31C

CODON-OPTIMIZED Con-C-2003 140CF (1,888 nt.)

Nick name: 003

TTCAGTCGACAGCCACCATGCGAGTGAGAGGCCATTCTGCGGAATTGTGAGCAATGGTGGATCTGGGGCATACTCGGATCTGGAT  
GCTTATGATATGCAATGTTGTGGGAACCTGTGGGTACCGTATATGAGGTTCAGTCTGGAAGGAGCTAAACAAACGCTG  
TTCGTGCAAGTGACGCCCAAGCCTACGAGAAAGAGTGCACACGCTGCGGTACCCACGCTGTGTTCAAACGATCCAAACC  
CCCAGGAAATCGTCTCGAGAACGTGACTGAAAACCTTAAACATGTGGAAGATGATATGGTAGATCAGATGCACGAAGATATCAT  
TTCATTGTGGGACCAATCATTTGAAACCATGCGTAAACCTGACCCCCCTCTGCGTAACACTTAACTGCACCAATGCAACTAATGCC  
ACCAATACTATGGCGGAATAAATAAATGTAAGTGTAAACATTAACCGGAACCTCCGGGATAAGAAACAAAGGTCTACGGCTCT  
TTTACCGACTCGATATCGTCCCACTTAACGAGAAATAATAGTTACCGCTGATTAACCTGTAACTGTAACTGCAACATCAGCCATTACGCAAGCTTG  
CCCCAAAGTTCTTTTCGACCCCATCCCAATTCACATTTGTGCCCCCGCTGGATACGCTATACCTTAAATGCAACAATAAACAATTT  
AATGGAAACCGCATTAACAACGTCAGTACCGTACCAATGTACGCACGGAATTAAACCTGTTGTCTCAACCCAGCTTCTCCTTA  
ACGGCTCATTTGGCGGAGGAAGAAATTAATCAGATCAGAAACCTTGACCAACAATGCCAAACCATCATCTGTCACCTCAATGA  
ATCCGTGGAATCGTGTGCACCCAGACCAATAACAATACCGGAATCAATCAGGATTTGGGCTGGCCAGACATTTACGCTACA  
GGTGATATAATTTGGCGATATTAGACAAAGCCCATTTGCAACATATCAGAAGACAAAGTGAATAAGACTCTGCAGAAGGTTTCTAAGA  
AGCTGAAGGAACACTTCCCAATAAAGCATTAAGTTCGAGCCCTCTTCAGGAGGAGACCTTGAGATCACAACACACTCTTTTAA  
TTGTAGAGGGAGTCTTCTATTGTAATACATCAAGCTCTTTAACAGTACCTACAACTCCACTAATAGTACCATCACTCCCC  
TGCAGAAATAAGCAATAATCAACATGTGGCAAGAAAGTTGGCCGAGCAATGTAGCCCCCTCCCATCGCAGGCAACATTACATGTA  
AATCCAATATTACTGGCCTTTTGTGTGACACGGGACGGGGAAGAAATAACACTGAGACCTTCAGACCTGGCGGAGCGGATATGCG  
CGATAATTGGCGGAGCGAGCTCTACAAGTATAAAGTCTGTTGAAATCAAGCCACTGGGCATAGCTCCTACGAAGCAAAGACACTC  
ACTGTTCAGGCTAGACAGCTGCTCTCCGGCATAGTGCAACAGCAATCCAACTCTCCTGCGAGCTATCGAAGCCCAACAACATATGC  
TCCAGCTTACCGTCTGGGGAATCAACAATGCAAAACACGAGTGTGGCGATAGAGAGATATTTGAAAGATCAGCAACTCCTGGG  
GATTTGGGCTGTTACAGTAAGCTCATCTGTACAACCTGCGGTGCCGTGGAACCTCAAGCTGGAGTAACAAAAGCCAAAGAGATATA  
TGGGACACATGACTTGGATGCAGTGGGATCGAGAAATAAGCAACTATACAGATACCATTTATCGGCTCCTGGAGGACTCACAGA  
ACCAGCAGGAGAAATAAGAGAAAGATTGCTCGCGCTTGACAGTTGGAAGAATTGTGGAATTGGTTCGACATTACAAACTGGCT  
CTGGTAAAGATCTTACAA

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Fig. 32A

**CONSENSUS G-2003 (842 a.a.)**

MRVKGIQRNWQHLLWKWGTLLGLVLIICSASNNLWTVVYGVVPWEDADTTLFCASDAKAYSTERHNVWATHACVPTDPNPQEITL  
 ENVTEFNMMKNNMVEQMHEDIISLWDESLKPCVKLTPLCVTLNCTDVNTNNTNNTKKEIKNCSEFNITTEIRDKKKKEYALFY  
 RLDVVPINDNGNSSIYRLINCNVSTIKQACPVTFDPIPIHYCAPAGFAILKCRDKKFNGTGPKCNVSTVQCTHGKPKVSTQLL  
 LINGSLAEIEEIIIRSENITDNTKVIIVQLNETIEINCTRPNNNTRKSIRIGPGQAFYATGDIIGDIRQAHCVSRTKWNEMLOKVK  
 AQLKKIFNKSITFNSSSGGDLTTHSFNCRGEFFYCNTSGLFNSSLNSTITLPCIKQIVRMWQRVGQAMYAPPIAGNIT  
 CRSNITGLLLTRDGGNNNTETFRPGGDMRDNRSELYKYIKVIKPLGVAPTRARRRVEREKRAVGLGAVLLGFLGAGSTMG  
 AASITLTVQVROLLSGIVQQSNLLRAIEAQHLLQLTVWGKQLOARVLAVERYLKDOQLLGIWCSGKLICTTNVPWNTSWSN  
 KSYNEIWDNMTWIEWEREISNYTQIYSLIEESQOQEKNEQDQLLALDKWASLNNWFDITKWLWYIKIFIMIVGGLIGLRIVFAV  
 LSIVNRVRQGYSPLSFQTLTHHQREPDPERIEEGGGEQDKDRSIRLSVSGFLALAWDDLRLSLCLFSYHRLRDFILLIARTVELLG  
 RSSLKGLRLGWGLKYLWNLWLLYWGQELKNSAINLLDTIAIVANWTDREVQAQACRAILNIPRRIRQGLERALL

\*Amino acid sequence underlined is the fusion domain that will be deleted in 140CF design and the "W" underlined with red color is the last amino acid at the C terminus, and all the remaining amino acids after the "W" will be deleted in 140CF design.

Fig. 32B

**Con-G-2003 140CF (626 a.a.)****Nick name: 007**

MRVKGIQRNWQHLLWKWGTLLGLVLIICSASNNLWTVVYGVVPWEDADTTLFCASDAKAYSTERHNVWATHACVPTDPNPQEITL  
 ENVTEFNMMKNNMVEQMHEDIISLWDESLKPCVKLTPLCVTLNCTDVNTNNTNNTKKEIKNCSEFNITTEIRDKKKKEYALFY  
 RLDVVPINDNGNSSIYRLINCNVSTIKQACPVTFDPIPIHYCAPAGFAILKCRDKKFNGTGPKCNVSTVQCTHGKPKVSTQLL  
 LINGSLAEIEEIIIRSENITDNTKVIIVQLNETIEINCTRPNNNTRKSIRIGPGQAFYATGDIIGDIRQAHCVSRTKWNEMLOKVK  
 AQLKKIFNKSITFNSSSGGDLTTHSFNCRGEFFYCNTSGLFNSSLNSTITLPCIKQIVRMWQRVGQAMYAPPIAGNIT  
 CRSNITGLLLTRDGGNNNTETFRPGGDMRDNRSELYKYIKVIKPLGVAPTRARLTIVQVROLLSGIVQQSNLLRAIEAQOH  
 LLQTLVWGKQLOARVLAVERYLKDOQLLGIWCSGKLICTTNVPWNTSWSNKSNEIWDNMTWIEWEREISNYTQIYSLIEES  
 QNOQEKNEQDQLLALDKWASLNNWFDITKWLW\*

\*Amino acids seen in blue color is for easy identification of the junction of the deleted fusion cleavage site

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## Fig. 32C

CODON-OPTIMIZED Con-G-2003 140CF.seq

Nick name:007

TTCAGTCGACAGCCACCATGCGAGTGAAGGAATCCAGAGAAATTGGCAGCACCTTTTGAAGTGGGGCACACTCATCTCGGCCT  
TGTGATCATATGCTCTGCTCAATAACCTTTGGTCACAGTTTATTACGGCGTCCCCGTTTGGAGGACGACACAACTCTTT  
TTTGTGCCAGCGACGCTAAGCTTATTCAACAGAGAGGCATAACGTTTGGGTACACATGCATGCGTGCCGACCGATCCTAATC  
CCCAGGAAATCACTCTTGAGAAATGTTACAGAGAAATTTAATAATGTTGAAGAACAAACATGGTTGAACAGATGCATGAAGACATAAT  
TTCCTCTGGGATGAATCTCTGAAACCTTGGTGAAGCTTACACCCTGTGCGTTACCTGAAATTGCATGACGTCAATGTCAACA  
AATAATAATACCAACAATACAAATAAAGAAATCAAAAATTTCTTTCAACATAACCAACCGAGATACGGATATAAATAAAGAAAG  
AATACGCCCTGTTCTACAGACTCGATGTGGTCCCAATTAATGACAAACGGAATTTCTCCATCTACCGACTTATCAATTGTAACGT  
GTCTACAATCAACAGGCCGTGCTAAAGTCACATTTGACCCCTATTCCCATTCATTACTGTGCCCCGCTGGCTTCGCTATTCTT  
AAATGCCGAGACAAAATTTAAGGACAGGACCATGCAAGAAATGCTCAACAGTTCAATGCAC'TCATGGAATFAAACCCAGTCG  
TTTCTACTCAACTCTTCAATGGAAGCCTGGCAGAAGAGGAATCAATAATCCGAGCGAAACATACCGCATCGGCC  
AATCATCGTACAGTGAACGAGACCATTGAATAAATTTGACGAGACCTAATAATAACAAAGAAAGCATACCGCATCGGCC  
TGCTTCAGAAAGGTCAAAGCTCAGCTCAAGAAAATATTCAACAAATCTATTACATTCAACTCATCATCAGGCGCGATCTGGAGAT  
AACAACTCATTCCTTCAACTGTCGGGAGAAATTTTTTACTGTAAACACGTCGGCTGTTCAACAATTCACTCCTGAATAGCACT  
AACTCCACCATCACTCTCCCATGTAAGATCAACAATCGTCAGAAATGTGGCAGCGAGTCGGTCAAGCTATGTACGCCCTCCAA  
TCGCCGTAATATCATGTAGAACAAATATCACAGGCTCTTGCTTACAAGGACGCGGGAACAACAACCCGAAACCTTCAG  
ACCAGGAGGAGGACATCGGAGACAAATGGCGGAGCGAGCTGTATAAATAAAGATCGTAAATAACCAATCCAATCTTCTTAGAGCAA  
CCAACTAGAGCCCCGAACTGACCGTGCAGGTGAGGCAACTGTGAGCGGCATTTGCCAACAACTCAATCTTCTTAGAGCAA  
TCGAGGCCCCAGCAGCATCTGCTCCAGCTTACTGTATGGGAATCAACAACCTGCAAGCAAGATTTGGCAGTGGAGAGGTATCT  
CAAGGACCAAGCAGCTTCTGGGAATTTGGGTTGCAGCGGAAAGCTCATATGTACAACTATGTCCCTGGAACACTAGTTGGAGT  
AATAAGATTACAATGAATCTGGGACAATATGACATGGATCGAATGGGAGCGGGAATATCCAATATACTACGCAAAATCTATT  
CCCTCATTTGAAGAGAGTCAGAAACGAGGAAAGAAATGAGCAAGACCTCCTCGCCCTGGATAAATGGGCATCTCTGTGGAACCTG  
GTTTGACATAACTAAATGGTTGTGGTAAAGATCTTACAA

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Fig. 33A

**CONSENSUS 01 AE-2003 (854 a.a.)**

MRVKETQMNWPNLWKWGTLILGLVICSASDNLWVTYYGVPVWRDADTTLFCASDAKAHETEVEHNVWATHACVPTDPNPQEIHL  
 ENVTFENFMWKNMVEQMQEDVISLWDQSLKPCVKLTPLCVTLNCTNANLTNNITNVSNIIGNITNEVRNCSFNMTTELDRDKK  
 QKVHALFYKLDIVQIEDNNSYRLINCNTSVIKQACPKISFDPIPIHYCTPAGYAILKCNCKNFNGTGPCKNVSSVQCTHGKIPVV  
 STQLLNGSLAEEEEIIIRSENLTNNAKTIIVHLNKSVEINCTRPSNNTRTSITIGPGQVFYRTGDIIGDIRKAYCEINGTKWNEV  
 LKQVTEKLKEHFNNKTIIFQPPSGGDLITMHHFNCRGEFFYCNTTKLFNNTCIGNETMEGCNGTIIILPCKIKQIINMWQAGQA  
 MYAPPISGRINCVSNTIGILLTRDGGANNTEFRPGGNIKDNWRSELYKYKVQVQIEPLGIAPTRAKRRVVEREKRAVGIGAMI  
FGFLGAAGSTMGAASITLTVOARQLLSGIVQQSNLLRAIEAQHLLQLTVWGIKQLQARVLAVERYLKDKQFLGLWGCSGKIIC  
TAVPWNSTWSNRSFEEIWNMTWIEWEREISNYTNOIYEILTESQOQDRNEKDLLELDKWLWAFEDITNWLWYIKIFIMIV  
 GGLIGLRIFIIFAVLSIVNRVROGYSPLSFQTPTHHOREPDRPERIEEGGEGQGRDRSVRLVSGFLALAWDDLRLSLCLFSYHRLRDE  
 ILIAARTVELLGHSSLKGLRRGWGLKYLGNLLLYWGQELKISALSILDATAIAVAGWTDREVIEVAQGAWRAILHIPRRIRQGLE  
 RALL

\*Amino acid sequence underlined is the fusion domain that will be deleted in 140CF design and the "W" underlined with red color is the last amino acid at the C terminus, and all the remaining amino acids after the "W" will be deleted as 140CF.

Fig. 33B

**Con-AE01-2003 140CF.pep (638 a.a.)****Nick name: 008**

MRVKETQMNWPNLWKWGTLILGLVICSASDNLWVTYYGVPVWRDADTTLFCASDAKAHETEVEHNVWATHACVPTDPNPQEIHL  
 ENVTFENFMWKNMVEQMQEDVISLWDQSLKPCVKLTPLCVTLNCTNANLTNNITNVSNIIGNITNEVRNCSFNMTTELDRDKK  
 QKVHALFYKLDIVQIEDNNSYRLINCNTSVIKQACPKISFDPIPIHYCTPAGYAILKCNCKNFNGTGPCKNVSSVQCTHGKIPVV  
 STQLLNGSLAEEEEIIIRSENLTNNAKTIIVHLNKSVEINCTRPSNNTRTSITIGPGQVFYRTGDIIGDIRKAYCEINGTKWNEV  
 LKQVTEKLKEHFNNKTIIFQPPSGGDLITMHHFNCRGEFFYCNTTKLFNNTCIGNETMEGCNGTIIILPCKIKQIINMWQAGQA  
 MYAPPISGRINCVSNTIGILLTRDGGANNTEFRPGGNIKDNWRSELYKYKVQVQIEPLGIAPTRAKTILTVQARQLLSGIVQQQ  
SNLIRATEAQHLLQLTVWGIKQLQARVLAVERYLKDKQFLGLWGCSGKIICTAVPWNSTWSNRSFEEIWNMTWIEWEREISN  
YTNQIYEILTESQOQDRNEKDLLELDKWLWAFEDITNWLW\*

\*Amino acids seen in blue color is for easy identification of the junction of the deleted fusion cleavage site.

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## Fig. 33C

CODON-OPTIMIZED Con-AE01-2003 140CF.seq (1945 nt.)

Nick name: 008

ttcagtcgacagccaccatgCGAGTCAAGGAAACACAAATGAAGTGGCCTAATCTGTGAAGTGGGCAACCCCTGATCCTGGGTTT  
GGTCATTATTGCTCTGCGAGCGACAATCTCTGGTTACTGTCTATTACGGAGTCCCGTTTGGAGAGATGCCGACACTACACTG  
TTCTGGCCCTCAGATGCCAAAGCTCATGAAGTGCATAATGTTTGGCAACCCACGCTGTGTTCTTACCGACCCCAACC  
CCCAAGAAATACACCTGGAAACCGTGACCGAGAACTTAAATATGTGAAGATAACATGGTTGAACAGATGCAAGAAGACGTAAT  
CAGCCTGTGGGATCAAAGTCTGAAACCTTGCGTAAACTGACTCCACTTTCGCTAACACTTAATTGCACCAACGCGAACCTTGACA  
AACGTTAAACAACATCACTAACGTCTCCAACTCATCGGCAACATAACGACGAAGTGAGAAATTCGAGTTTCAATATGACTACAG  
AGTCCGGGACAAGAAACAGAAGGTCATGCTCTCTTTTACAAACTCGACATCGTCCAGATCGAAGACAATAACAGCTACAGACT  
TATAAATGTATAACATCCGTGATTAAACAAGCATGCCCAAAATAAGCTTCGATCCTATTCTATCCACTACTGTACTCCTGCC  
GGCTATGCTATCTTGAAATGCAATGATAAGAACTTCAATGGGACCGGACCTTGTGAAGACGTGTAGTGTGCAATGCACCTCAG  
GCATTAAACCAAGTGAAGCACCCAGCTGCTCTGGAACGGCTCTCTGGCAGAGGAAGATTATTATTCGAAGTGAGAACCCTCAC  
CAACAACGCTAAGACTATCATCGTACATCTCAATAAATCAGTCGAAATTAATTGCACAGACCCCTCCAATAATACTAGAACTTCA  
ATCACTATCGGCCAGGACAAGTCTTTTATAGAACAGGAGATATCATAGGAGATATCAGAAAGGCATATTGCGAGATAAACGGGA  
CAAAATGGAACCGAAGTACTCAACAAGTCACAGAGAAGCTTAAGGAACATTTCAACAATAAAACCATTTATTTC AACCCCAAG  
TGCGGAGACCTCGAAATCACTATGCACCACTTCAACTGCCGCGGGAATTTTTTATGTCAATACCACTAACTTTTCAACAAT  
ACGTGCATCGGAAATGAGACCATGGAGGGTCAATGGAAACATCATACTCCCATGCAAGATAAAACAATCATTAACATGTGGC  
AAGGTGCTGGACAAGCTATGTATGCACCCCAATATCCGGTAGAATTAATTGCGTCAGCAACATCACTGGCATACTGCTCACTAG  
AGACGGAGGAGCAATAATACAAATGAACATTCGACCGGCGGCAACATTAAGGACAACCTGGCGTCCGAACTCTATAAG  
TACAAAGTCGTACAGATCGAACCTCTTGGAATAGCACCGACTCGCGCTAAGACACTCACAGTACAGGCCCGACAACTTCTTTCTG  
GAATCGTACAGCAATCCAACTCTCTCCGCAATCGAGGCCCAACAACATCTGCTTCACTCAGCTCACAGTTTGGGGAATCAAGCA  
GCTCCAGGACCGGTGCTCGAGTGGAAAGATACCTGAAGGATCAGAAATTCCTTGGTCTCTGCGGATGTTCTGGCAAAATAATC  
TGCACTACCGGGTCCCTGGAATCAACATGGAGCAACCGAGTTTGAAGAGATATGGAACAATATGACATGGATAGAGTGGG  
AAAGGGAATTAGTAACATATACGAACCAAGATATACGAAATCCTCACCGAAAGCCAAATCAGCAGGATCGCAACGAAAGACCT  
CCTCGAGCTTGATAAGTGGGCATCCCTTTTGGAACTGGTTTCGACATCAAAATTTGGCTCTGGTaaagatcttataa

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Fig. 34A

**Wild-type subtype A Env****00KE\_MSA4076-A (Subtype A, 891 a.a).**

MGAMGIQMNWQNLWRWGTMLGMLIICSVAEKS~~WVT~~YVYGVVWRDAETTLFCASDAKAHDKEVHN~~VW~~ATHACVPTDPNPQEMIL  
 ENVTEDFNMWKN~~SM~~VEQMHTDIIISLWDQSLKPCVKLTPLCVTLNCSDSNITSNSTKDSATLDMKSEIQNCSEFNM~~TT~~ELRDK  
 KQKVSLFYRLDVQINENSSDYRLINCNTSAITQACPKVTFEPIPIHYCAPAGFAILKCNDKKFNGTGPCTNVSTVQCTHGKIP  
 VVTTQLLLNGSLAE~~EE~~VMIRSENITENAKNIIIVQFKEPVQIIICIRPGNNTRKSVHIGPGQAFYATGDIIGDIRQAHCNVSRELWN  
 KTLQEVATQLRKHF~~R~~NNTKIIFTNSSGGDVEITTHSFNCGGEFFYCDTSGLFNSSWTASND~~SM~~QEAHSTESNITLQCRIKQIIINM  
 WQRAGQAMYAPPIPGIIRCESNITGLILTRDGGEGNNSTNETFRPVGGNMRDNWRSELYKYKVVEPLGVAPT~~KSR~~RRVVEREK  
 RAVGLGAVFIGFLGAAGSTMGAASMTLTVOARQLLSGIVQQSNLLRAIEAQHLLKLTWGIKQLQARVLAVERYL~~RD~~QQLLGI  
WGCSGKLICTTNVPWNSSWSNKS~~L~~DEIWENMTWQWDKEVSNYTM~~Y~~NYNLL~~EE~~SQ~~Q~~QEKNEQELLALDKWANLW~~N~~W~~N~~FNISN~~W~~LW  
 YIKIFIMIVGGLIGLRIVFAVLSVINRVROGYSPLSFQTHTPNPRGLDRPGRIEEEGEQDRDRSIRLVSGFLALAWDDLRSLCL  
 FSYHRLRDFILIAARTLELLGHNSLKLGLRLGWGLKYLWNLAYWGRELKIS~~A~~ISLVD~~S~~IAIAVAGWTDRIEIVQAIGRAILHI  
 PRRIRQGLERALI

\*Amino acid sequence underlined is the fusion domain that will be deleted in 140CF design and the "W" underlined with red color is the last amino acid at the C terminus, and all the remaining amino acids after the "W" will be deleted in 140CF design.

Fig. 34B

**00KE\_MSA4076-A 140CF.pap (647 a.a)****Nick name: 011**

MGAMGIQMNWQNLWRWGTMLGMLIICSVAEKS~~WVT~~YVYGVVWRDAETTLFCASDAKAHDKEVHN~~VW~~ATHACVPTDPNPQEMIL  
 ENVTEDFNMWKN~~SM~~VEQMHTDIIISLWDQSLKPCVKLTPLCVTLNCSDSNITSNSTKDSATLDMKSEIQNCSEFNM~~TT~~ELRDK  
 KQKVSLFYRLDVQINENSSDYRLINCNTSAITQACPKVTFEPIPIHYCAPAGFAILKCNDKKFNGTGPCTNVSTVQCTHGKIP  
 VVTTQLLLNGSLAE~~EE~~VMIRSENITENAKNIIIVQFKEPVQIIICIRPGNNTRKSVHIGPGQAFYATGDIIGDIRQAHCNVSRELWN  
 KTLQEVATQLRKHF~~R~~NNTKIIFTNSSGGDVEITTHSFNCGGEFFYCDTSGLFNSSWTASND~~SM~~QEAHSTESNITLQCRIKQIIINM  
 WQRAGQAMYAPPIPGIIRCESNITGLILTRDGGEGNNSTNETFRPVGGNMRDNWRSELYKYKVVEPLGVAPT~~KSR~~TLTVQARQ  
LLSGIVQQSNLLRAIEAQHLLKLTWGIKQLQARVLAVERYLRDQQLLGIWGCSGKLICTTNVPWNSSWSNKS~~L~~DEIWENMTW  
QWDKEVSNYTMYNYNLLEESQ~~Q~~QEKNEQELLALDKWANLW~~N~~W~~N~~FNISN~~W~~LW\*

\*Amino acids seen in blue color is for easy identification of the junction of the deleted fusion cleavage site.

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## Fig. 34C

CODON-OPTIMIZED 00KE\_MSA4076-A 140CF.seq (1972 nt.)

Nick name: 011

ttcagtcgacagccaccatggtgggccaattgggaattccagatgaactggcagaacacctctgscgatggggcacaaatgatcctgggtat  
gctcatcatctgctgttgcagaaaagtcattgggtaacagctctactacggcgtaccagtggtggcgggacgccgaaaccactctc  
ttctggccctccgatgccaaagcacacagataaagaagtccacaattgtttgggtaccctatgctgctgcccacacccgatcctaac  
cacaagaaatgatactcgaaaacgttactgaagacttcaacatggtgaaaattctatggttgaacagatgcacacccgacataat  
atcactgtgggatcagctctctcaaacctgtgtcaaatgtgacccccctctgctgtacactgaactgttccgactcaaatatcact  
tctaatcaacagacaatagtacgaagactccgcaaccttgatatgaagaagcgaatacagaactgttcatttaatatgacca  
ccgaactgagagataaaaagcagaaggtttattctctgttctatcgattggacgtggttcagattaacgaaataagcagcgaatta  
ccgactcattaaactgcaatacatcagcaatcacacaggttgcccaaggtaacatttgagccaatcccatttactactgagcc  
cctgcaggatttgccatcctgaaatgcaacgataagaagtttaattgggacaggaacctgcaccaacgtctccacccgtgcaatgca  
cccacggcataaaacctgtgttacccacacaaattgctgctcaatggatcacttgcctgaagaggaagtcattgatctcggtctgaaaa  
catcactgaaaaatgccaaaaatattatagttcagttcaagaaacccgtccagatcatttgcattcgccctggtaaacacactcgc  
aagtcagtcacattgggcccggccaggctttctatgcaacccggagataattataggcgacatcagacagggcacattgcaacgtca  
gcccggaaattgtggaacaaaactttgcaggaagtgtctactcagctgccgaaaacatttcagaaacaatacacaagattattttcac  
taattcatcaggggtgacgtggagatcactacccattcatttaactgtggcggagaattcttctattgcgatacctctgagctc  
ttttaattcctcatggactgctagcaacgattcaatgcaagaagcacattccacagaaagtaatatcacactgcagtgccgaatta  
aacaaatcatcaatatgtggcagcggccgggtcaagcaatgtacgcacctcccattccccggaattattcgatgtgagtcataat  
cactggcctcatctgaccccgagacgggtggcgaaggtaataattctacaacagagactttcagacccgtaggaggcaatatgccga  
gacaattggcgatccgaactgtataataataaagtgtgaaggtagaacctcttgagtgccacccaccaccaatcacgaacctga  
ctgtgcaggcaccgcaactctgagcgggaatagtcacaagcaatccaatcttctgagagctatagaagcccgacgaacacctgct  
taaaacttacggtgtggggaatcaaaacaattgcaggcaagagtgtgscagtggaaacgatacttgagagaccacaactcctggga  
atctggggatgttccggtaagttgatttgacgcgacaaacgttccctggaactcttccctggtcaaacacagagctggacgaaat  
gggaaaatatgacatggatgcagtgggacaggaagttagcaactatcacagatgatctacaacctcctcgaaagaaatctcagaa  
tcaacagggaaaaaaacgaacaaagaaactgctcgccctcgataagtgggctaacctctggaaactgggtttaataatttcaaaactggttg  
tggtaagatcttataa

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Fig. 35A

Wild-type subtype B

QH0515.1g gp160 (861a.a)

MRVKEIRRNQCRLRRWGTMLGMLMICSATEQLWVTYYGVPVWKEATTLFCASDAKAYVTEKHNWATHACVPTDPNPQEVVL  
 ENVTFENFMWKNMVEQMHEDIISLWEQSLKPCVKLTPLCVTLNCTDKLRNDTSGTNSSSWEKVQKEIKNCSEFNITTGIRGRVQ  
 EYSLFYKLDVIPIDSRNNSNSTEFSSYRLISCNTSVITQACPKISFEPIPIHYCAPAGFAILKCNDDKKFNGTGPCKNVSTVQCT  
 HGKIPVSTQLLNGSLAEVEVIRSENFNTNNVKSIIIVQLNKSVINCTRPNNNTRKSIHIGAGKALYTGEIIGDIRQAHCNLSR  
 AQWNTLKQIVIKLREQFGNKTIVFNQSSGGDVEIVMHSFNCGGEFFYCNSQTFNSTWNGNDTWNDTWKDTTNDNITLPCRIRKQ  
 IVNMWQKVGKAMYAPPPIRQIRCSSKITGLILTRDGGTNGTNETETFRPGGGMKDNWRSELYKYKVVKIEPLGLIAPTAKARRV  
 QREKRAVGTIGAMFELGFGAAGSTMGAASLTLTQARLLLSGIVQQQNNLLRAIEAQHLLQLTVWGIKQLQARVLAVERYLRDQ  
QLLGIWGCSGRLICTTNVPWNTSWSNRSNLYIWDNMTWQWDREINNYTDYIYTLLEDAQNQQEKEQELLELDKWLNNWFDI  
 TNWLWYIKIFIMIVGGLIGLRIVFAVLSIVNRVRQGYSPISLQTHLPARRGPDPRPEGIEGGERDRDRSVRLVHGFALVWEDL  
 RSLCLFSYHRLRDLILLIVARTVEILGQGWALKYWNWLLLYWSLELKNASVSLVDTIAIAVAEGTDRIIEIARRIFRAFLHIPT  
 RIRQGLERALL

\*Amino acid sequence underlined is the fusion domain that will be deleted in 140CF design and the "W" underlined with red color is the last amino acid at the C terminus, and all the remaining amino acids after the "W" will be deleted in 140CF design

Fig. 35B

QH0515.1g 140CF (651a.a)

Nick name: 012

MRVKEIRRNQCRLRRWGTMLGMLMICSATEQLWVTYYGVPVWKEATTLFCASDAKAYVTEKHNWATHACVPTDPNPQEVVL  
 ENVTFENFMWKNMVEQMHEDIISLWEQSLKPCVKLTPLCVTLNCTDKLRNDTSGTNSSSWEKVQKEIKNCSEFNITTGIRGRVQ  
 EYSLFYKLDVIPIDSRNNSNSTEFSSYRLISCNTSVITQACPKISFEPIPIHYCAPAGFAILKCNDDKKFNGTGPCKNVSTVQCT  
 HGKIPVSTQLLNGSLAEVEVIRSENFNTNNVKSIIIVQLNKSVINCTRPNNNTRKSIHIGAGKALYTGEIIGDIRQAHCNLSR  
 AQWNTLKQIVIKLREQFGNKTIVFNQSSGGDVEIVMHSFNCGGEFFYCNSQTFNSTWNGNDTWNDTWKDTTNDNITLPCRIRKQ  
 IVNMWQKVGKAMYAPPPIRQIRCSSKITGLILTRDGGTNGTNETETFRPGGGMKDNWRSELYKYKVVKIEPLGLIAPTAKATLTV  
QARLLLSGIVQQQNNLLRAIEAQHLLQLTVWGIKQLQARVLAVERYLRDQQLLGIWGCSGRLICTTNVPWNTSWSNRSNLYIWD  
 NMTWQWDREINNYTDYIYTLLEDAQNQQEKEQELLELDKWLNNWFDITNWLW\*

\*Amino acids seen in blue color is for easy identification of the junction of the deleted fusion cleavage site.



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**Fig. 35C****CODON-OPTIMIZED QH0515.1g 140Cf.seq (1984 nt.)****Nick name:012**

ttcagtcgacagccaccatgagagtaaaagaaaatcagacgcaactgtcagaggttgaggagatggggaacgatgctctgggcat  
gctgatgatTTGCAGTGCCACCGAACAGCTTTGGTAACCGTGTAATAATGGTGTAACCTGTATGGAAGAAGCCACTACAAACCTTG  
TTTTCGGCGTCCGACGCCAAAAGCCTACGTAACAGAAAAGCACAACGTGTGGGCCACACATGCATGCGTGCCAACAGATCCAAATC  
CTCAGGAAGTCGTTCTGGAAAATGTAACAGAAAATTTTAATATGTGGAAAACAATAATGGTAGAGCAGATGCATGAAGATATCAT  
CTCAGTGTGGGAACAATCCTTGAAACCTTGTAACCTGACCCCACTTTCGCTAACACTTAACCTGATGATAAGCTTCGCAAT  
GATACGTCGGGAACAAATCAAGCAGCTGGGAAAAGTGCAAAAGGCGGAAATCAAAAATTTGTTCAATTAACATCACTACCGGFA  
TCAAGAGGCGGGTACAGGAATATTCCTTTTCTACAAATCGACGTCAATCCCAATCGACTCCAGAAATAACTCAAATAATAGCAC  
AGAATTTAGTAGTTATCGCTTATAAGCTGCAACACCGGTGATTACACAAGCGTGCCCTAAAATCTCTTTGAGCCCATTCCT  
ATTCACTACTGGCACCGCGCTTCGCCATCCTCAAAATGTAACGACAAGAAATTTAACGGAAACCGGACCCCTGTAAAGATGTGT  
CCACCCTTCAATGCACATCATGGAATCAAGCCCGTCGTTTCTACCCAACTTCTCTCAATGGTAGCCTTTCGGGAGGAGGAAGTTGT  
GATTCCGCTCCGAAAATTTTACAAAACAACGTCAAGTCAATCATCGTCCAGCTTAATAAATCCGTCGTTATTAAATGTACAAGACCC  
AACAATAACACAGAAAATCCATTACATAGGGGCCGGGAAAGCTCTGTATACCGGGGAAATTTATGGAGACATCAGACAAGCAC  
ACTGTAACCTGAGTCGCGCCCAAGTGAACACACATGAAACAGATCGTGATCAAGCTCAGAGAGCAGTTCGGGAATAAGACTAT  
CGTGTTAATCAGAGCTCCGGCGGTGATGTCGAAATCGTAATGCACCTTTTAATTGTGGGTGAATTTTCTTACTGCAATTC  
ACACAAATTTTAAACAGCACCTGGAACGGCAATGACACATGGAATGACACCTGGAAGATACGACAAATGATAATATTAATCTTC  
CGTGCAGAATAAAGCAATCGTAAATATGTGGCAAAAAGTGGCAAGGCCATGTACGCCACCACTATAAGAGGACAAATTCGCTG  
TTCTTCCAAGATCACAGGCTGATACCTCACACGGGACGGAGGCACGAACGGGACAAACGAGACCGAGACCTTCGACCCAGGAGGC  
GGCAACATGAAGGATAACTGGAGAGTGAACCTTTACAAGTATAAAGTGGTCAAGATTGAGCCTCTGGGTATCGCCCTACTAAGG  
CTAAAACACTCACCGTGCAGGTAGATTGCTGCTTTCAGGGATAGTCCAAACAACAGAACCACTTCTTAGAGCCATTGAAGCACA  
ACAACACTTGCTGCAGTTGACAGTGTGGGAATTAACAGTTGCAGGCCCGGTTCTCGCTGTGGAACGGTATCTTAGAGATCAG  
CAGCTTTTGGGTATCTGGGGTGTTCAGGCCCGCTCATATGCACCAAAATGTCCCTTGAATACCTCATGGAGTAACAGGTCTC  
TTAATTATATTGGGACAATATGACATGGATGCAATGGGATAGAGAAATTAATAACTACACCGACTACATCTACACACTTCTGGA  
GGACGCCCAAGATCAGCAGGAGAAGAACGAGCAGGAACCTCCTCGAATTGGATAAGTGGGCATCACTGTGGAATTGTTTCGATATA  
ACTAATTGGCTTTGGtaaatcttataa

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Fig. 36A

Wild-type subtype C

DU123.6 gp160 (854 a.a)

MRVKGIGQPNWPQWIIWGILGFWMIIICRVVGNLWVTYYGVPVWTEAKTTLFCASDAKAYEREVHNWVWATHACVPTDPNPQEIIVL  
 GNVTFENFMWKNMDVDMQHEDIISIWDQSLKPCVKLTPLCVTLNCTDVKNATSNGTITTYNNSIDSMNGEIKNCSEFNITTEIRDK  
 KQKVYALFYRPDVVPLNENSSSYILINCTSTTTQACPKVSFDPIPIHYCAPAGYAILKCNKTFNGTGPCHNVSSTVQCTHGKIP  
 VVSTQLLNGSLAEEIIIRSENLTNNAKTIIVHLNESIEIVCTRPNNNTRKSIRIGPGQTVYATNDIIGDIRQAHNCNISKTKWN  
 TTLEKVKELKEHFPSKAITFQPHSGGDLEVTTHSFNCRGEFFYCDTTKLFNESNLNTTNTTLTLPCRICKQIVNMWQGVGRAMY  
 APPVEGNITCNSSITGLLLVRDGGNTSNSTPEIFRPGGNNMKDNWRSELYKYKVVEIKPLGVAPTAKARRVVEREKRAVGIGAVL  
 FGFLGAAGSTMGAASITLTVOARQLLSGIVQQSSNLLRAIEAQOQMLQLTVWGKQLQARVLAIERYLKDDQQLLGLWGCSGKLIC  
 PTTVPWNSSWSNKSQTDIWDNMTWMQWDREISNYTGTIYKLLSESONQOQEKNEKDLLALDSWKNLWSWFDITNWLWYIKIFIMIV  
 GGLIGLRIIFGVLSIVKRVROGYSPLSFQTLTPNPRGLDRIGRIEEEGEGQDKDRSIRLVNGFLALAWDDLRSLCLFSYHRLRDE  
 ILVAARAVELLGRSSLRGLQRGWEALKYLGNLVQYGGLELKRRAISLEFDTIAIAVAEGTDRILEVILRIIRAINIPTRIRQGF  
 AALL

Fig. 36B

DU123.6 140CF (638 a.a)

Nick name: 013

MRVKGIGQPNWPQWIIWGILGFWMIIICRVVGNLWVTYYGVPVWTEAKTTLFCASDAKAYEREVHNWVWATHACVPTDPNPQEIIVL  
 GNVTFENFMWKNMDVDMQHEDIISIWDQSLKPCVKLTPLCVTLNCTDVKNATSNGTITTYNNSIDSMNGEIKNCSEFNITTEIRDK  
 KQKVYALFYRPDVVPLNENSSSYILINCTSTTTQACPKVSFDPIPIHYCAPAGYAILKCNKTFNGTGPCHNVSSTVQCTHGKIP  
 VVSTQLLNGSLAEEIIIRSENLTNNAKTIIVHLNESIEIVCTRPNNNTRKSIRIGPGQTVYATNDIIGDIRQAHNCNISKTKWN  
 TTLEKVKELKEHFPSKAITFQPHSGGDLEVTTHSFNCRGEFFYCDTTKLFNESNLNTTNTTLTLPCRICKQIVNMWQGVGRAMY  
 APPVEGNITCNSSITGLLLVRDGGNTSNSTPEIFRPGGNNMKDNWRSELYKYKVVEIKPLGVAPTAKAKTLTVQARQLLSGIVQQQ  
 SNLLRAIEAQOQMLQLTVWGKQLQARVLAIERYLKDDQQLLGLWGCSGKLICPTTVPWNSSWSNKSQTDIWDNMTWMQWDREISN  
 YTGTYKLLSESONQOQEKNEKDLLALDSWKNLWSWFDITNWLW\*

\*Amino acids seen in blue color is for easy identification of the junction of the deleted fusion cleavage site.

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**Fig. 36C****CODON-OPTIMIZED DU123.6 140CF.seq (1945 nt.)****Nick name: 013**

ttcagtcgacagccaccatgCGCGTAAAGGGGATTCAAAGAAATTGGCCGCAATGGTGGATTGGGGAATTCTGGGCTTTTGGAT  
GATAATTATATGCCGCGTTGTCGGAATTTGTGGTGACTGTGTACTACGGGTGCCGTGTGGACTGAGGCAAGACCAACCCCTG  
TTCGTGTAGCGATGCCAAGCCTATGAACGCGAAGTGCACATGTTTGGCTACTCATGCTGTGTCCCTACCGACCCAAACC  
CTCAGGAATAGTGTCTGGCAATGTAAACGGAATCTCAACATGTGAATAATGATATGGTGGATCAGATGCACGAAGACATTAT  
CTCAATCTGGGACCAAGCCTGAACCCCTGCTTAACTGACTCTCTCTGCGTCACTCTCAATTGCACAGATGTCAAAGTGAAT  
GCCACCTCAACGGTAGCACAACCTTACAACAATTCTATTGACTCTATGAACGGGAAATCAAAAATTGTTCTTTAACATCACCA  
CCGAGATACGGCACAAAAGCAGAAAGTCTATGCCCTTTTACCGCCCGACGTAGTCCCACTCAACGAGAAATCCAGCTCATA  
CATCCTCATCAACTGCAATACATCAACTACCAACAAGCATGCCGAAAGTTAGCTTTGATCCAATTCCCTATACATTACTGCGCC  
CCGCGGGCTACGCTACTGAAATGCAATAATAAGACTTTTAACGGGACCGGCCCATGTCAACAACGTGTCAACCGTCAATGCA  
CTCATGGCATCAAGCCCGTGGTGTCAACCCAGCTGCTCAATGGCTCACTTGCAGAAGAATAATTATTATCCGCTCTGAGAA  
TCTTACTAACAAATGCAAAAACGATTATCGTGCACCTTAATGAATCAATAGAAATCGTGTGTAATCGGCCCAACAATACTAGA  
AAAAGCATTGCGATCGGACCTGGCCAGACAGTTTACGCAACTAATGACATCATCGGGGACATCCGACAGGCCCATTGCAACATTT  
CTAAACCAAGTGGAATACAAACCTGGAAAAGTAAAGGAAAACCTTAAAGAACATTTCCCTCTAAGGCGATCACGTTTCAACC  
TCACAGTGGCGGAGACTTGGAGTCACACACATCTTTTAACTGCCGCGGAGAAATTTTATTGTGATACAAACAACTTTT  
AATGAATCAAACTCAACACCAACAATAACACCACTGACCTCCCTGTAGAAATCAACAAATCGTAAACATGTGGCAAGGGG  
TTGGAAGGGCTATGTACGCTCCCCCGTGAAGGAAATATAAGTGAACAGCAGCATCACTGGGCTGCTTCTTGTTCGAGACGG  
AGGCAATACTTCTAATCAACTCCTGAAATTTTAGGCTGGCGGTGGCAATATGAAAGATAACTGGCGCTCAGAACTGTACAAA  
TACAAAAGTTGTGAATTAAGCCCTGGGAGTCGCTCAACCAAGCTAAACACTCACAGTGAAGCAAGACAGCTCCTTTTCAAG  
GCATCGTCCAGCAACAGTCAAAATCTCCTTAGAGCAATCGAAGCCCAACAGCATATGCTGCAACTCACAGTCTGGGGGATTAAACA  
GCTTCAAGCCCGGTGCTATCGAACGCTATCTTAAAGACCAACAGCTTCTTGGCCTCTGGGTTGTAGTGGAAACTCATC  
TGCCCCACCAACCGTGCCTTGGAAATAGTTCTTGGAGTAATAAATCACAGACCGATATTGGGACAAACATGACCTGGATGCAATGG  
ATAGGGAATTTCTAATTATCTGGCACAATCTACAACTCTTGGAAAGAAAGTCAAAATCAGCAAGAAAACGAAAAGGACCT  
CCTCGCCCTGGACTCCTGGAAGAATCTTTGGAGCTGTTGACATAACTAATTTGGCTGTGGTaaagatcttataca

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Fig. 37A

Wild-type subtype CRF01\_AE

97CNGX2F-AE (854 a.a.)

MRVKETQMNWP<sup>NL</sup>WK<sup>WT</sup>ILGLV<sup>I</sup>ICSASDNLWTVYGV<sup>PV</sup>WRDADTTLFCASDAKAHETE<sup>VH</sup>NVWATHACVPTD<sup>PN</sup>PQE<sup>I</sup>HL  
 ENVTFN<sup>WR</sup>NRN<sup>NM</sup>VEQ<sup>MQ</sup>EDVISLWDQSLKPCVKLTPLCVTLNCTNANW<sup>TNS</sup>NTTNGPNKIGNITDEVKNCTFNM<sup>TT</sup>TELKDKK  
 QKVHALFYKLDIVQINSSEYRLINCNTSVIKQACP<sup>KIS</sup>FDPIPIHYCTPAGYAILKCN<sup>DK</sup>NFN<sup>GT</sup>GPCKNVSSVQCTHG<sup>IK</sup>PPVS  
 TQLLNGSLAEE<sup>EE</sup>IIIRSENLTNNAK<sup>TI</sup>I<sup>V</sup>HLNKSVEINCTRPSN<sup>TR</sup>TSITMGPGQVFYRTGDIIGDIRKAYCEINGIKWNEVL  
 VQVTGKLKEHFNK<sup>TI</sup>IFQPPSGGDLEIITHFSCRGEFFYC<sup>NT</sup>TKLFNNTCIGNTSMEGCNNTIILPCKIKQIINMWQGVQ<sup>Q</sup>AMY  
 APPISGRINC<sup>VS</sup>NITGILLTRDGGADNNTTNETFRPGGNIKDN<sup>WR</sup>SELYKYKVVEIEPLGIAPTRAKR<sup>RV</sup>VEREKRAVGIGAMI  
 FGLGAAGSTMGAASITLT<sup>V</sup>QARQLLSGIVQQSNLLRAIEAQ<sup>QH</sup>LLQLTWG<sup>IK</sup>QLQARVLAVERYLKDQKFLGLWGC<sup>SG</sup>KIIC  
 TTAVP<sup>W</sup>NSWSNKSFE<sup>EE</sup>IWDNMTWIEWEREISNYTSQIYEILTESQ<sup>NO</sup>QDRNEKDLLELDK<sup>W</sup>ASLWNWFDITNWLWYIKIFI<sup>IV</sup>  
 GSLIGLRIIFAVLSIVNRVQGYSP<sup>LS</sup>FQTP<sup>TH</sup>HQREPRPEEIGE<sup>GG</sup>EQSKDRSVRLVSGFLALAWDDLRSLCLFSYHLLRDF  
 ILIAARTVELLGHSSLKGLRRGWEGLKYLGNLLLYWGQ<sup>EIK</sup>ISAISLLNATAIAVAGWTD<sup>RV</sup>IEVAQRAWRAL<sup>LH</sup>IPRRIRQGLE  
 RALL

\*Amino acid sequence underlined is the fusion domain that will be deleted in 140CF design and the "W" underlined with red color is the last amino acid at the C terminus, and all the remaining amino acids after the "W" will be deleted in 140CF design.

Fig. 37B

97CNGX2F-AE 140CF.p<sup>ep</sup> (629 a.a.)

Nick name: 018

MRVKETQMNWP<sup>NL</sup>WK<sup>WT</sup>ILGLV<sup>I</sup>ICSASDNLWTVYGV<sup>PV</sup>WRDADTTLFCASDAKAHETE<sup>VH</sup>NVWATHACVPTD<sup>PN</sup>PQE<sup>I</sup>HL  
 ENVTFN<sup>WR</sup>NRN<sup>NM</sup>VEQ<sup>MQ</sup>EDVISLWDQSLKPCVKLTPLCVTLNCTNANW<sup>TNS</sup>NTTNGPNKIGNITDEVKNCTFNM<sup>TT</sup>TELKDKK  
 QKVHALFYKLDIVQINSSEYRLINCNTSVIKQACP<sup>KIS</sup>FDPIPIHYCTPAGYAILKCN<sup>DK</sup>NFN<sup>GT</sup>GPCKNVSSVQCTHG<sup>IK</sup>PPVS  
 TQLLNGSLAEE<sup>EE</sup>IIIRSENLTNNAK<sup>TI</sup>I<sup>V</sup>HLNKSVEINCTRPSN<sup>TR</sup>TSITMGPGQVFYRTGDIIGDIRKAYCEINGIKWNEVL  
 VQVTGKLKEHFNK<sup>TI</sup>IFQPPSGGDLEIITHFSCRGEFFYC<sup>NT</sup>TKLFNNTCIGNTSMEGCNNTIILPCKIKQIINMWQGVQ<sup>Q</sup>AMY  
 APPISGRINC<sup>VS</sup>NITGILLTRDGGADNNTTNETFRPGGNIKDN<sup>WR</sup>SELYKYKVVEIEPLGIAPTRAR<sup>TL</sup>T<sup>V</sup>QARQLLSGIVQ<sup>Q</sup>Q  
 SNLLRAIEAQ<sup>QH</sup>LLQLTWG<sup>IK</sup>QLQARVLAVERYLKDQKFLGLWGC<sup>SG</sup>KIIC<sup>TT</sup>AVP<sup>W</sup>NSWSNKSFE<sup>EE</sup>IWDNMTWIEWEREISN  
 YTSQIYEILTESQ<sup>NO</sup>QDRNEKDLLELDK<sup>W</sup>ASLWNW\*

\*Amino acids seen in blue color is for easy identification of the junction of the deleted fusion cleavage site.

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**Fig. 37C****CODON-OPTIMIZED 97CNGX2F-AE 140CF.seq (1921 nt.)****Nick name: 018**

ttccagtcgacàgcccaccatgCGAGTAAAGAGàCACAAATGAATTGGCCCCAATTTGTGGAAGTGGGAACATTGATCCTGGGACT  
 GGTGATAATCTGTAGTGCATCCGACAAATCTCTGGGTGACCGTTTACTATGGTGTACCAGTTTGGAGAGACGCTGATACCACCCCTC  
 TTCGTGCAAGCAGCGCCAAAGCCACGAAACTGAAGTCCATAATGTATGGGCCACCCACGCGTGCCTACCAACCGACCCCTAATC  
 CCCAAGAGATCCACCTTGAGAAATGTAACCTGAGAAATTTTAACATGTGGAGAAATAACATGGTGAACAAATGCAGGAAGACGTTAT  
 TTCCTTGTGGGACCAGAGCCCTTAACCTTGTGTCAATTTGACTCCCTGTGTGACTCTCAATTGTACAAACGCAATTTGGACC  
 AACAGCAACAACTACCAACGGCCCTAACAAATTTGGCAATATTAAGTGAAGTCAAGAACTGCACCTTTTAACATGACAAACAG  
 AACTGAAGGATAGAAACAGAAAGTCCATGCTCTGTCTATAAGCTCGACATAGTACAAATTAATAGCTCAGAATATAGACTGAT  
 AAATGCAATACTTCCGTTATCAACAGGCGCTGTCCAAAGATAAGCTTCGATCCCATCCCTATTCTACTGACACACCCCGGT  
 TACGCTATCCTGAAATGCAACGATAAGAAATTTAACGGCACAGTCCCTGCAAAAAGTTTCTCTGTCCAGTGTACACACGGTA  
 TCAAGCCTGTAGTATCAACACACTGCTCCTGAATGGCTCCTTGGCCGAAGAGAGATCAATCATTAGAAGTGAGAACCTGACGAA  
 CAAGCCCAAGACTATAATAGTGACCTCAATAAATCTGTAGAAATCAACTGTACCCGACCCCTCAAAACAACACTCGAAACAAGTATA  
 ACAATGGGCCCTGGCCAAAGTTTTCACGACCGCGGACATAATAGGCGATATCAGAAAGGCATATTTCCAGCCCCGAGTGGCGG  
 AGTGGAAACGAAGTACTGTTCAAGTAACTGGAACACTCAAGAAACATTTTAAAGACCATATTAAGACCATATTTCCAGCCCCGAGTGGCGG  
 CGACCTCGAGATTATCACCCTACCTTTCTGTAGAGCGGAATTTTCTTACTGTAAACACGACCAAGCTCTTCAATAACACGTGC  
 ATCGGGAACACTTCTATGGAAGGATGTAATAATACCAATTAAGTCCCTGTAAAGTCAAGCAGATTATCAACATGTGGCAGGGAG  
 TAGGTCAGGCAATGTACGCACCCGATTTTCAGGACGGATCAATTGCGTATCAATAATCACCGGCATTCTGTGACCCGGGACGG  
 AGGCGCAGACAACAATACCAACAGACATTTAGACCTGGAGCGGCAATATAAGGATAATTTGGAGAAGTGAGCTGTATATAA  
 TACAAAGTCGTAGAGATCGAACCCCTCGGCATTGCTCCAACCCGGGCCGACTCTCACCGTAAAGCTAGACAGCTGCTTTCTG  
 GCATAGTCCAACAGCAGTCAAACTCTCCGCGCTATTGAAGCACAAACACCTGCTCCAGCTGACTGTGTGGGAATCAAACA  
 ATTGCAAGCAAGAGTGTCTCGCCGTGGAACGCTATTGAAAGATCAGAAATTTCTTGGACTTTGGGCTGCAGCGGCAAAATATT  
 GTACAAACAGCGGTGCTTGGAACTCATCTGGAGTAATAAAGCTTTGAAGAAATCTGGACAATATGACATGGATTGAGTGGG  
 AGAGAGAGATTTCAAACATATACAAGCCAAATTTACGAAATACTGACAGAAAGTCAAAACCCAGCAGGACAGAAATGAGAAAGACCT  
 GCTCGAACTGGATAAGTGGGCCTCTTTGTGGAACCTGgtaagatccttataca

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Fig. 38A

**Wild-type DRCBL-G (854a.a.)**

MRVKGIQRNWQHLLWNWGILILGLVICSAEKLWTVVYGVVPWEDANAPLFCASDAKAHSTESHNIWATHACVPTDPSPQEIINMR  
 NVTENFNWKNMVEQMHEDIISLWDESLKPCVKLTPLCVTLNCTEINNSTRNITEEYRMTNCSFNMTTELDRDKKAEYALFYR  
 TDVVPINEMNNENGTSTWYRLTNCNVSTIKQACPVTFEPIPIHYCAPAGFAILKCVDDKKNFTGTCNNVSTVQCTHGKIPVV  
 STQLLLNGSLAEKDIIISSENISDNKAVIIVHLNRSVEINCTRPNNNTRRSVAIGPGQAFYTTGEVIGDIRKAHCNVSWTKWNET  
 LRDVQAKLQEYFINKSIEFNSSSGGDLITTHSFNCGGEFFCYNTSGLENNISILKSNISENNDTITLNCIKIQIVRMWQRVGOAM  
 YAPPIAGNITCRSNITGLILTRDGGDNNSTSEIFRPGGDMKNWRSELYKYKTVKIKSLGIAPTRARRRVEREKRAVGVAIF  
 LGFLGTAGSTMGAASITLTQVVRQLLSGIVQQSNLLRAIEAQHLLQLTVWGIKQLRARVLALELYLKDQQLLGIWGCSSGKLIC  
 TTNPWNTSWSNKSNEIWENMTWIEWEREIDNYTHYHISLIEQSQIQOEKNEQDILLALDQWASLWSFISNWLWYIRIFVMIV  
 GGLIGLRIVFAVLSIVNRVQGYSPLSFQTLHHQREPDPAIEEGGEGQDRDRSIRLVSGFLALAWDDLRLSLCLFSYHRLRDF  
 ILIAARTVELLGRNSLGLRLGWEALKYLNLLLYWARELKNRAINLLDTIAIVANWTDTRVIEVAQRAVLAFLNIPRRIRQGLE  
 RALL

\*Amino acid sequence underlined is the fusion domain that will be deleted in 140CF design and the "W" underlined with red color is the last amino acid at the C terminus, and all the remaining amino acids after the "W" will be deleted in 140CF design.

Fig. 38B

**DRCBL-G 140CF.pap (630 a.a.)****Nick name: 017**

MRVKGIQRNWQHLLWNWGILILGLVICSAEKLWTVVYGVVPWEDANAPLFCASDAKAHSTESHNIWATHACVPTDPSPQEIINMR  
 NVTENFNWKNMVEQMHEDIISLWDESLKPCVKLTPLCVTLNCTEINNSTRNITEEYRMTNCSFNMTTELDRDKKAEYALFYR  
 TDVVPINEMNNENGTSTWYRLTNCNVSTIKQACPVTFEPIPIHYCAPAGFAILKCVDDKKNFTGTCNNVSTVQCTHGKIPVV  
 STQLLLNGSLAEKDIIISSENISDNKAVIIVHLNRSVEINCTRPNNNTRRSVAIGPGQAFYTTGEVIGDIRKAHCNVSWTKWNET  
 LRDVQAKLQEYFINKSIEFNSSSGGDLITTHSFNCGGEFFCYNTSGLENNISILKSNISENNDTITLNCIKIQIVRMWQRVGOAM  
 YAPPIAGNITCRSNITGLILTRDGGDNNSTSEIFRPGGDMKNWRSELYKYKTVKIKSLGIAPTRARRRVEREKRAVGVAIF  
 SNLLRAIEAQHLLQLTVWGIKQLRARVLALELYLKDQQLLGIWGCSSGKLICTTNPWNTSWSNKSNEIWENMTWIEWEREIDN  
 YTHYHISLIEQSQIQOEKNEQDILLALDQWASLWSW\*

\*Amino acids seen in blue color is for easy identification of the junction of the deleted fusion cleavage site.

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**Fig. 38C**

**CODON-OPTIMIZED DRCBL-G 140CF.seq (1921 nt.)**

**Nick name: 017**

ttcagtcgacagccaccatgagagttaaaggaattccaacgcaattggcaacacacctttggaaactggggcattattgattcttggact  
 ggtgataaatttgacgctgaaaaactctgggtaactgtctattacggcgtgcctgtctggagagatgccaaagccccctgttctg  
 tggcgaagtgatgcaaggctcacagcactgaatctcaaacatttggggcaccacgctgtgtggcgaacccgacctagtcctc  
 aggagatcaacatgagaaacggttacccgaaaatttttaatatgtggaagataatatgttgagcaaatgcacgaagacataatttc  
 actctgggacgagctctgaaaccatgtgtgaaccttaccctgtggtcaccctgaaactgtaccgaaatcaacraataactca  
 acgagaaatatcacagagaataccgaatgactaactgttcccttaatatgacaaccgaaactgcgagacaaaaagaaggtgaat  
 acgcaactttctaccgaacagatgtgtaccaatcaacgagatgaacaatgaaacaaatggaacgaactctacctggtatagact  
 gacaaactgtaacgttagcacaaatcaacgagcctgccccctaaagtacattcgaaaccaataccgaattcacgtacgtgacccgccc  
 ggattcgctatttcttaagtgcgtgataagaagtttaacggaaactggaactgcaataatgtatctacagtacaatgcacgcgatg  
 gaattaaagcctgtcgtttcaaccctgctgtgaatggatcactcgcaaaaaaggatatttatctcaagcgaacacatatc  
 tgataatgcaaaaggtcatcatcgctccacctcaacgctcagttgaaataaactgcactcgccctaaataataacaaagacgctct  
 gtcgcaatcgggccaggacaagctttttacactaccggggaagttaacggacatacggaaagccccactgcaacgcttagctgga  
 ccaagtggaaatgaaacactgcgcgatgtttcaagccaaacttcaagaatacttcataaaacaaatcaattgagttcaattctagctc  
 tggcggcgacctcgagattacaactcaactccttttaactgaggggcgaattcttttatgtataacctccggtctcttcaacaaac  
 tctatcctcaaaagtaacatttctgaaaataatgacacaatcacactgaattgcaagatcaagcagattgttaggatgtggcaac  
 gagtcggacaaagctatgtacggccccaccatcgccggaaatataacgtgtcgatcaaatatcaactggcctcatccttactagaga  
 tggcggagacaataatagcaccagcgagatattcagaccagggcgaggcgatataaaaaaaactggaggtcagagctctacaag  
 tacaaaaacagtcaaaattaaaagcctgggcatgtctccactcgggcccgacactgactgtcccaagtcgacagctcctgtccg  
 gaatcggtcccaaacagtcctcaactgtgctgaggctatagaggctcaacaacatctccttcaactgactgtgtgggtatcaaaaca  
 attgagagcaagagtgctggcgctggaacgggtatcttaaggaccacaactcctgggcataatgggggtgttccggcaaacatgac  
 tgcacacaaatgtaccctggaaacacagctggtcaaataaaagttataatgagatatgggaaacatgacatggattgaatggg  
 aaagggaattgacaattatataccatatatactctctcatcgaaacatctcagatacaacaggaagaaagaatgaacaagattt  
 gttggctcttgaccaatgggcttctttgtggagttggtaaatcttataa

## 2003 Centralized HIV-1 Envelope Proteins and the Codon-Optimized Gene sequences

Fig. 39A

## 2003 Cons Env

MRVMGIQRNCQHLWRWGILIFGMLIICSAEENLWTVYGVVWKEANTLFCASDAKAYDTEVHNVWATHACVPTDNPQEIIVLENTENF  
 NMWKNMVEQMHEDIISLWDQSLKPCVKLTPLCVTLNCTDVNATNNTTNNEEIKNCSFNITTEIRDKKKVYALFYKLDVVPIDDDNNSYRLI  
 NCNTSAITQACPKVSFEPIPIHYCAPAGFAILKCNCKKFNCTGPKCNVSTVQCTHGKIPVSTQLLNGSLAEEIIIRSENITNNAKTIIIV  
 QLNESVEINCTRPNNNTRKSIIRIGPGQAFYATGDIIGDIRQAHCNISRTKWNKTQQVAKKLREHFNKTIIFNPSSGGDLIETTHSFNCGGE  
 FFYCNTESEFNSTWNGTNNITITLPCRICKIINMWQGVQAMVAPPYIEGKIRCTSNITGLLLTRDGGNNNTETFRPGGDMRDNRSELYKYK  
 VVKIEPLGVAPTAKRRVVEREKRAVGIGAVFLGFLGAAGSTMGAASITLTVOARQLLSGIVQQSNLLRAIEAQHLLQLTVWGIKQLQAR  
 VLAVERYLKDQQLGIWGCSGKLICTTNVPWNSSWSNKSQDEIWDNMTWMEWDKEINNYTDIISLIEESQOQEKNEQELLALDKWASLWN  
 WFDITNWLWYIKIFIMIVGGLIGLRIVFAVLSIVNRVRQGYSPLSFQTLIPNPRGPDPRPEGIEEGEGEQDRDRSIRLVNGFLALAWDDLRSL  
 CLFSYHRLRLDLILIAARTVELLGRRGWEALKYLNWLLQYWQQLKNSAISLLDTTAAIAVAEGTDRVIEVQRCRAILNIPRRIRQGFERAL  
 LLS

Fig. 40A

## 2003 M. Group.Anc. Env

MRVMGIQRNCQHLWRWGILIFGMLIICSAEENLWTVYGVVWKEANTLFCASDAKAYDTEVHNVWATHACVPTDNPQEIIVLENTENF  
 NMWKNMVEQMHEDIISLWDQSLKPCVKLTPLCVTLNCTDVNATNNTTNMGEIKNCSFNITTEIRDKKKVYALFYRLDVVPINDNNSYRLI  
 NCNTSAITQACPKVSFEPIPIHYCAPAGFAILKCNCKKFNCTGPKCNVSTVQCTHGKIPVSTQLLNGSLAEEIIIRSENITDNAKTIIIV  
 QLNESVEINCTRPNNNTRKSIIRIGPGQAFYATGDIIGDIRQAHCNISGAENKTLQVAAKLREHFNKTIIFKPSSGGDLIETTHSFNCGG  
 EFFYCNTESEFNSTWNGTNNITITLPCRICKIIVNMWQVRVQAMVAPPYIAGNITCKSNITGLLLTRDGGTNNNTETFRPGGDMRDNRSELYKY  
 KVKIEPLGVAPTAKRRVVEREKRAVGIGAVFLGFLGAAGSTMGAASITLTVOARQLLSGIVQQSNLLRAIEAQHLLQLTVWGIKQLQAR  
 RVLAVERYLKDQQLGIWGCSGKLICTTNVPWNSSWSNKSQDEIWDNMTWMEWDKEINNYTDIISLIEESQOQEKNEQELLALDKWASLW  
 NWFDITNWLWYIKIFIMIVGGLIGLRIVFAVLSIVNRVRQGYSPLSFQTLIPNPRGPDPRPEGIEEGEGEQDRDRSIRLVSGFLALAWDDLRSL  
 LCLFSYHRLRLDLILIAARTVELLGRRGWEALKYLNWLLQYWQQLKNSAISLLDTTAAIAVAEGTDRVIEVQRCRAILNIPRRIRQGFERAL  
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Fig. 40B

2003 M. Group. anc Env. seq. opt

ATGGCGTGATGGGATCCAGCGCAACTGCCAGCACCTGTGGCGCTGGGGCATCCTGATCTTGGGATGCTGATGATCTGCTCCGCGCGCGA  
GAACCTGTGGTGACCGGTGTACTACGGCGTGCCCGTGTGAAGAGGGCCAAACACCCCTGTTGTGCGCCTCCGACGCCAAGGCCCTACGACA  
CCGAGGTGCACAACGTTGGGCCACCCACGCCCTGGTGGCCACCGACCCCAACCCCGAGAGATCGTGTGAGAACGTGACCGAGAACCTTC  
AACATGTGAAGAACAAATGTTGGAGCAGATGCACGAGGACATCATCTCCCTGTGGGACCACTCTCTGAGCCCTGAGCCCTGCGTGAAGCTGACCCC  
CCTGTGCGTGACCCCTGAATGCACCGAGCTGAAGCCACCAACATCCACCAACTGGGCGAGATCAAGAACTGCTCTTCAACATCACCA  
CCGAGATCCGCGACAGAAGAGAGGTGTACGCCCTGTCTACCGCTGGAGCTGGTCCCATCAACGACAACAACTCTTACCGCTGATC  
AACTGCAACACCTCCGCCATCACCCAGGCTGCCCAAGGTGCTCTCGAGCCCATCCCATCCACTACTGCGCCCCCGCGGCTTCGCCAT  
CCTGAAGTGCAACGACAAGAGTTCAACGGCACCGGCCCTGCAAGAACGTGTCCACCTCCGAGAACATCACCGAACGCAACGCAATCATCGTG  
CCACCCAGCTGCTGTAACGGCTCCTTGGCGGAGGAGATCATATCCGCTCCGAGAACATCACCGAACGCAACGCAATCGGCTTCTACGC  
CAGTGAACGAGTCCGTGGAGATCAACTGCACCGCCCAACAAACACTCCGGGCGCGAGTGGAAACAGACCTGACAGAGTGGCCGCAAGC  
CACCGCGACATCATCGCGACATCCGCCAGGCCACTGCAACATCTCCGGGCGCGAGTGGAAACAGACCTGACAGAGTGGCCGCAAGC  
TGCGGAGCACTTCAACAACAAGACCATCATCTTCAAGCCCTCCTCCGGCGGGGACCTGGAGATCACACCCACTCCTTCAACTGCGGGG  
GAGTCTTCTACTGCAACACCTCCGGCTGTTCAACTCCACTGGAACGGCACCAACGAGACCATCACCTGCCCTGCCGATCAAGCAGAT  
CGTGAACATGTGGAGCGGTGGCCAGGCCATGTACGCCGCCCATTCGCCGCGGCGGACATGGGAGAACCTGGCGCTCCGAGCTGTACAAGTAC  
TGACCGCGACGGCGCACCAACAACACCGAGACCTTCCGCCCGCGGCGGACATGGGAGAACCTGGCGCTCCGAGCTGTACAAGTAC  
AAGTGGTGAAGATCAGCCCCCTGGGCGTGGCCCCCAACAGGCCAAGCGCGGCTGGTGGAGCGCGAGAACGCGCCGTGGGCATCGGCGC  
CGTGTCTCTGGGCTTCTGGGCGCGCGGCTCCACCATGGGCGCGCTCCATCACCTGACCTGACGCGCGCGAGCTGCTGTCCGGC  
TCGTGCAGCAGCATCCAACTGCTGGCGGCTCGAGGCGCGAGCACCTGCTGAGCTGACCGTGGGCGATCAAGCAGCTGACGCGC  
CGCGTGTGGCGTGAGCGCTACCTGAAGGACACGAGCTGCTGGGCTGCTGGGCTGCTGGGCAAGCTGATCTGCACCAACCAACGCTGC  
CTGGAATCTCTCTGTGTCACAAGTCCCAGGACGAGATCTGGGACAACTGACTGGATGGAGCGGAGATCTCCAACATACACG  
ACATCATCTACTCCCTGATCGAGGAGTCCAGAACCGAGGAGAGAACGAGAGGACCTGCTGGCCCTGGACAAGTGGGCCCTCCCTGTGG  
AACTGGTTCGACATCAACAACTGGCTGTGGTACATCAAGATCTTCTCCAGACCTGATCCCAACCCCGCGGCCCGGACCGCCCGGCG  
GCTGTCCATCTGTAACCGCGTGGCCAGGCTACTCCCGCTGTCTCCAGACCTGATCCCAACCCCGCGGCCCGGACCGCCCGGCG  
GCATCGAGGAGGAGGCGGAGCAGGACCGCGACCGCTCCATCCGCTGGTGTCCGGCTTCTGGCCCTGGCCTGGACGACCTGCGCTCC  
CTGTGCTGTCTCTTACCAACCGCTGCGGACTTCTCTGTATCGCCCGCCGACCGTGGAGCTGCTGGGCGCGCGCGGCTGGGAGGCGCT  
GAAGTACCTGTGGAACCTGCTGAGTACTGGGCGCAGGAGCTGAAGAACTCCGCGCATCTCCCTGCTGGACACCAACCGCCATCGCCGTGGCGG  
AGGGCACCGCGTGATCGAGGTGGTGCAGCGCGCTGCCGCGCCATCTCTGACATCCCCCGCGCATCCGCGCAGGGCTTCGAGCGCGCGC  
CTGCTGTAA

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Fig. 41A

2003 CON A1 Env

MRVMGIQRNCOHLRWGTMILGMIIICSAEENLWTVVYGVPMKDAETTLFCASDAKAYETEMHNVWATHACVPTDNPQEIHLNVTEEF  
 NMWKNMVEQMHTDIIISLWDQSLKPCVKLTPLCVTLNCSNVNTNTNTHHEEIKNCSENMTELKQKQVYSLFYRLDVVPINENNSNS  
 SYRLINCNTSAITQACPVSFEPIPIHYCAPAGFAILLCKKDFENGTPCKNVSTVQCTHGKIPVVSQLLNGSLAEFEVIRSENITNNA  
 KTIIVQLTKPVKINCTRPNNNTRKSIRIGPGQAFYATGDIIGDIRQAHCVSRSEWNKTLOKVAQOLRKYFNKNTIIFNSSGGDLIETTHS  
 FNCGGEFFYCNTSGLFNSTWNGTMTKNTITLPCRIKQIINMWQRAGQAMYPPIQGVIRCESNITGLLTRDGGNNNTNETFRPGGDMRDN  
 WRSELYKYKVVKIEPLGVAPTRAKRRVVEREKRAVGIGAVELGAGSTMGAASITLTVOARQLLSGIVQQSNLLRAIEAQHLLKLTIV  
 WGIKQLOARVLAVERYLKDQQLLGIWGCCKLICCTTNVPMNSWSNKSQNEIWDNMWLOWDKELSNYTHIIYNLIEESQNOQKEQDLLA  
 LDKWANLWNNWEDISNWLWYIKIFIMIVGGLIGLRIVEAVLSVINRVROGYSPLSFQHTENPRGLDRPGRIEEGEGEQGRDRSIRLVSGFLA  
 LAWDDLRSCLCFSYHRLRDFILIAARTVELLGHSSSLKGLRLGWEGLYLWNLLLYWGRELKISAINLVDTIAIAVAGWTDRIEIGQRICRA  
 ILHIPRRIRQGLERALL\$

Fig. 42A

2003 A1.AnC Env

MRVMGIQRNCOHLRWGTMIFGMIIICSAEENLWTVVYGVPMKDAETTLFCASDAKAYDTEVHNVWATHACVPTDNPQEIHLNVTEEF  
 NMWKNMVEQMHTDIIISLWDQSLKPCVKLTPLCVTLNCSNVNTNTNTHHEEIKNCSENMTELKQKQVYSLFYRLDVVPINENNSNS  
 SYRLINCNTSAITQACPVSFEPIPIHYCAPAGFAILLCKKDFENGTPCKNVSTVQCTHGKIPVVSQLLNGSLAEFEVIRSENITDNA  
 KTIIVQLTEPVKINCTRPNNNTRKSIRIGPGQAFYATGDIIGDIRQAHCVSRSEWNKTLOKVAQOLRKYFNKNTIIFNSSGGDLIETTHS  
 FNCGGEFFYCNTSGLFNSTWNGTMTKNTITLPCRIKQIINMWQRAGQAMYPPIQGVIRCESNITGLLTRDGGNNNTNETFRPGGDMRDN  
 WRSELYKYKVVKIEPLGVAPTRAKRRVVEREKRAVGIGAVELGAGSTMGAASITLTVOARQLLSGIVQQSNLLRAIEAQHLLKLTIV  
 WGIKQLOARVLAVERYLKDQQLLGIWGCCKLICCTTNVPMNSWSNKSQDEIWDNMWLOWDKELSNYTHIIYNLIEESQNOQKEQDLLA  
 LDKWANLWNNWEDISNWLWYIKIFIMIVGGLIGLRIVEAVLSVINRVROGYSPLSFQHTENPRGLDRPGRIEEGEGEQGRDRSIRLVSGFLA  
 LAWDDLRSCLCFSYHRLRDFILIAARTVELLGRSSSLKGLRLGWEGLYLWNLLLYWGRELKISAINLLODTIAIAVAGWTDRIEIGQRICRA  
 ILNIPRRIRQGLERALL\$

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**Fig. 41B**

2003 CON A1 Env. seq.opt

ATGCGCGTGATGGGCATCCAGCGCAACTGCCAGCACTGCTGGCTGGGGCAACCATGATCCTGGGCATGATCATCTGCTCGCGCGCGGA  
GAACCTGTGGTGACCGTGTTACTACGGCGTGCCCGTGTTGGAAGGACGCCGAGACCACTGTTCTGGCCCTCCGACGCCAAGGCCTACGAGA  
CCGAGATGCACAACGTGTGGGCCACCCACGCTGCGTGCCCAACGACCCCAACCCCCAGGAGATCCACCTGGAGAACGTGACCGAGGAGTTC  
AACATGTGGAAGAACAACTGTTGGAGCAGATGCACACCGACATCATCTCCCTGTGGGACCACTCCCTGAAGCCCTGCGTGAAGCTGACCCC  
CTGTGCGTGACCTTGAACCTGCTCCAACGTGAACGTGACCAACCAACCAACCAACCCACGAGGAGGAGATCAAGAACTGCTCCTTCAACA  
TGACCAACCGAGCTGGCGCAAGAAGCAGAAAGGTGTACTCCCTGTTCTACCGCTGGACGTGTGCAGATCAACGAGAAACAACCTCCAATCC  
TCTTACCGCTTGATCAACTGCAACACTCCGCCATCACCCAGGCTGCCCAAGGTGTCCTTCGAGCCCATCCCATCCACTCCTACCTGCGGCCC  
CGCGGCTTCGCCATCCTGAAGTCAAGGACAAGGAGTTCACACGGCAACGGGCCCTGCCAAGAACGTGCCACCGTGCAGTGCACCCAGGCA  
TCAAGCCCGTGGTGTCCACCCAGCTGCTGTGAACGGCTCCCTGGCCGAGGAGGAGTGATCATCCGCTCCGAGAACATCAACAACAACGCA  
AAGACCATCATCTGTGAGCTGACCAAGCCCGTGAAGATCAACTGCACCCGCGCAACAACAACCCCGCAAGTCTCATCCGATCCGCTGCGG  
CCAGGCTTCTACGCCAACCGGCGACATCATCGCGACATCCGCCAGGCCACTGCAACGTGTCCGCTCCGAGTGGAAAGAACCTCTGCAGA  
AGGTGGCAAGCAGCTGCGCAAGTACTTCAAGAAACAAGACCATCATCTTCAACAACTCCTCCGGCGGCGACTGGAGATCAACCACTCC  
TTCAACTGCGGCGCGAGTCTTCTACTGCAACACCTCCGGCTGTTCAACTCCACTGGAAACAACGGCACCATGAAGAACACCATCACTT  
GCCCTGCCGATCAAGCAGATCATCAACATGTGGCAGCGCGCGGCGAGGCCATGTACGCCCCCCCATCCAGGGCGTGATCCGCTGGCGAGT  
CCAACTACCCGCGCTGCTGACCCCGCAGCGCGGCAACAACAACAAGACACTCCGCCCGGGCGGACATGCGGACAAAC  
TGGCGCTCCGAGCTGACAAGTACAAGTGTGAAGATCGAGCCCTGGCGCTGGCCCCCAACCGCCCAAGCGCGGTGGAGCGGA  
GAAGCGCGCGTGCGCATCGCGCGCTGTCTCGGCTTCTGGCGCGCGCGGCTCCACCATGGCGCCCGCTCCATCCATCCCTGACCGTGC  
AGGCCCGCCAGCTGCTGTCCGCGCATCTGTGCAGCAGCAGTCCAACTGCTGCGCGCATCGAGGCCACGACGACCTGCTGAAGCTGACCGTG  
TGGGGCATCAAGCAGCTGCAGGCCCGCGTGTGGCCGTGGAGCGCTACCTGAAGGACGACGAGTGTCTGGGATCTGGGGTGTCTCGGCA  
GCTGATCTGCACCACCAAGTGCCTTGGAACTCCTCCTGGTCCAACAAGTCCCAACAGATCTGGGACAACATGACTGGCTGCAGTGGG  
ACAAGAGATCTCCAACATACACCCACATCATCTACAACCTGATCGAGGAGTCCCAAGAACCCAGGAGAGAACGAGCAGGACCTGCTGGCC  
CTGGACAAGTGGGCCAACCTGTGGAACCTGGTTCGACATCTCCAACCTGGCTGGGTATCATCAAGATCTCATCATGATCTGTGGCGGCTGAT  
CGGCTCGGCATCTGTGTTCCGCGTGCTGTCCGTGATCAACCGGTGCGCCAGGCTACTCCCGCTGTCTCCAGACCCACACCCCAACC  
CCCGCGGCTTGAAACCGCCCCCGCGCATCGAGGAGGAGCGGCGCGGACCGCTCATCCGCTGGTGTCCGGCTTCTTGCGC  
CTGGCCCTGGGACGACCTGCGCTCCCTGTGCTTCTTCTACCAACCGCTTCCGCGACTTCACTCTGATCGCCGCCCGCACCGTGGAGCTGCT  
GGGCCACTCTCTCCCTGAAGGGCCCTGCGCCTGGGCTGGGAGGCGCTGAAGTACCTGTGGAACCTGCTGTACTTGGGCGCCGCGAGCTGAAGA  
TCTCCGCCCATCAACTGGTGGACACCATCGCCATCGCGGTGGCGGCTGGACCGCGCGTGTATCGAGATCGGCCAGCGCATCGGCGCGGCC  
ATCTGACACATCCCCCGCGGCATCCGGCCAGGGCCCTGGAGCGCGCCCTGCTGTAA

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**Fig. 42B**

## 2003 A1.anc Env.seq.opt

ATGGCGGTGATGGGCATCCAGGCAACTGCCAGCACCTGTGGCGTGGGGACCATGATCTTCGGCATGATCATCTGCTCCGCCGCCGCGGA  
GAACCTGTGGTGAACGTTACTACGGCTGCCGTGTGGAAGGACCCGAGACCAACCTGTTCTGCGCTCCGACGCCAAGGCCATCGACA  
CCGAGTGCACAACTGTGGGCCAACACGCTGCGTGCCACCGACCCCAACCCCGAGGATCGACCTGGAGAACGTGACCGAGGAGTTC  
AACATGTGGAAGAACAAACATGGTGGAGCAGATGCACGCCGACATCATCTCCCTGTGGACCACTCCCTGAAGCCCTCGCTGAAGCTGACCC  
CTGTGCGTGACCCCTGAACCTGCTCAACCTGAACGTGAACCAACCAACCAACCCAGAGGAGATCAAGAAGCTGCTCTTCAACA  
TGACCAACCGAGTGCAGCAAGAAGCAGAAGGTGACTCCCTGTTCTACCGCTGGACGTGTCCTTCGAGCCCCATCAACGAGAACACTCCAACTCC  
TCCCTACCGCTGATCAACTGCAACACCTCCGCCATCACCAGGCCCTGCCCAAGTGTCTTCGAGCCCCATCCCATCCACTACTGCGGCC  
CGCGGCTTCGCCATCCTGAATGCAAGGACAAGGATTC AACGGCACCGGCCCTGCAAGAACGTGTCCCTGAGCCCCATCAACGAGAACACTCCAACTCC  
TCAAGCCCGTGGTGTCCACCCAGTGTCTGCTGAACGGTCCCTGGCGAGGAGGATGATCCGCTCCGAGAACATCAACGACCAACGCC  
AAGACATCATCGTGACGTGACCGAGCCGCTGAAGATCAACTGCACCCGCCCAACAACAACTCCCGACCGAGTGGAAACAAGACCTGCAGA  
CCAGGCTTTAGGCCACCGCGACATCATCGCGACATCCGCGAGGCCACTGCAACGTGTCCCGACCGAGTGGAAACAAGACCTGCAGA  
AGGTGSCGCCAGCTGCGCAAGCACTTCAACAACAAGACCATCATCTTCAACTCTCTCCGCGGCGACCTGGAGATCACCACTCACTCC  
TTCAACTGGCGCGGAGTTCTTACTGCAACACCTCCGGCTGTTCAACTCCACTGGAAACAGCGCACCATGAAGACCAACCATCACTCC  
GCCCTGCCGATCAAGCAGATCATCAACATGTGGCAGCGGTGGCCAGGCCATGTACGCCCCCCCATCCAGGGGTGATCCGCTGCGAGT  
CCAACTCAACCGCTGCTGTGACCCGACCGCGGCAACAACAACAGAGACCTTCGCCGCCGCGCGCGGACATGCGCGACAAC  
TGCGCTCCGAGCTACAAGTACAAGTGGTGAAGTGCAGCCCTGGGCGTGGCCCCACCGCGCAAGCGCCGCTGGTGGAGCGCGA  
GAAGCGCCGCTGGGCTGGGCGCGGTGTTCTGGCTTCTGGCGCTCCACTGTCGCGGCTCAACATGGGCGCGCTCCATCACCTGACCGTGC  
AGGCCCGCAGCTGTGTCGGCATCGTGACAGCAGTCCAACTGTCGCGGCTGAGCGCTACCTGAAGGACCGAGCTGTGGGCTGCTCCGGCAA  
TGGGGCATCAAGCAGCTGCAGGCCCGCTGTCGGCGTGGAGCGCTACCTGGTCCAAAGTCCAGGACGAGATCTGGACAACATGACCTGGCTCAGTGGG  
GCTGATCTGACCAACCAAGTGCCTGGAACCTCCTGTCAGGAGTCCAGAACAGCAGGAGAACAGCAGCAGGACCTGCTCGGCGAA  
ACAAGGAGATCTCCAACATACCCGACATCATCTACAACCTGATCAGGAGTCCAGAACAGCAGGAGAACAGCAGCAGGACCTGCTGCGG  
CTGGACAAGTGGCCAACTGTGGAACTGGTTCGACATCTCCAACCTGGTGTGTATCAAGATCTTCATCATGATCTGTGGCGGCGCTGAT  
CGGCTCGGCATCGTGTTCGCGTGTCTGCTGATCAACCGGTGCGCAGGGCTACTCCCGCTGTGTCTTCCAGACCTGACCCCCAAC  
CCAGGGCCCCGACCGCCCGCGGATCGAGGAGGAGGCGGCGACAGGCCGCGACCGCTCATCCGCTGGTGTCCGCTTCTCGGCC  
CTGGCTGGAGACACTGCGCTCCCTGTGCTTCTTCTACCAACCGCTGCGCATCTCATCTGATCGCCGCCCGCACCGTGGAGCTGCT  
GGGCCGCTCCTCCTGAAGGCCCTGCGCTGGGTGGAGGCGCTGAAGTACTGTGAACTGCTGCTACTGGGGCCCGAGCTGAAGA  
TCTCCGCCATCAACCTGCTGGACCAACATCGCCATCGCGTGGCGGCTGACCGACCGCGTATCGAGATCGGCCACCGCATCTGCGCGCGC  
ATCTGAAACATCCCCCGCGCATCCGCCACGGCTGGAGCGGCGCTGCTGTAA

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## Fig. 39B

2003 CON-S Env. seq. opt

ATGCGCGTGATGGGCATCCAGCGCAACTGCCAGCACCTGTGGCGCTGGGGCATCCTGATCTTTCGGCATGCTGATCATCTGCTCCGCCGCCGA  
GAACCTGTGGTGACCGTGTAACCGCGTGCCCGTGGAAGGAGGCCAACACACCCCTGTTCGCGCTCCGACGCCAAGGCTACGACA  
CCGAGGTGCACAAAGTGTGGCCACCCACCGCTGCGTGCACCCGACCCCAACCCAGGAGATCGTGTGGAGAACGTGACCGAGAACTTC  
AACATGTGGAAGAACAAACATGTGGAGCAGATGACGAGGACATCATCTCCCTGTGGACCAAGTCCCTGAGAGCCCTGCGTGAAGTACCC  
CCTGTGCGTGACCCCTGAACCTGACCCGACGTGAACGCCACCAACAAACACCAACAGGAGATCAAGAACTGCTCCTTCAACATCACCA  
CCGAGATCCGCGACCAAGAAAGTGTACGCCCTGTTTACAAGCTGGACGTGGTGGCCATCGACGACAACAATCCTACCGCCTGATC  
AACTGCAACACCTCCGCCATCACCCAGGCTGCCCCAAGTGTCTTCGAGCCCATCCCCATCCACTACTGCGCCCCCGCGCTTCGCCAT  
CCTGAAAGTCAACGACAAAGATTCAACGGCACCGGCCCTGCAAGAACGTGTCCACCGTGACCGTCAACCGCATCAAGCCCGTGGTGT  
CCACCCAGCTGCTGCTGAACGGCTCCCTGGCCGAGGAGGATCATCATCCGCTCCGAGAACATCAACCAAGCCCAAGCATCATCTGTG  
CAGCTGAACGAGTCCGTGGAGATCAACTGCACCCCGCCCAACAACAACCCGCAAGTCCATCCGATCGGCCCGGCAAGCCCTTCTACGC  
CACCGCGACATCATCGCGGACATCCGCCAGGCCCTGCAACATCTCCGCAACCAAGTGGAAACAGACCTGCAGCAGGTGGCCAAAGAGC  
TGCGCGAGCACTTCAACAAGACCATCATCTTCAACCCCTCCCTCCGGCGGACCTGGAGATCAACCAACCATCACCTGCCCTGCCGATCAAGCAGATCA  
TTCTTCTACTGCAACACCTCCGAGCTGTTCAACTCCACTGGAACGGCACCAACAACCATCACCTGCCCTGCCGATCAAGCAGATCA  
CAACATGTGGCAGGCGTGGCCAGGCCATGTACGCCCCCGCCCATCGAGGCAAGATCCGCTGCACCTCCAACATCACCGCCTGCTGTG  
CCCGCGACGGCGCAACAACAACCGAGACCTTCCGCCCGCGCGGACATGCGCGACAACCTGGCGTCCGAGCTGTACAAGTACAAC  
GTGGTGAAGATCGAGCCCTGGCGGTGGCCCAACCAAGCCCAAGCGCGGTGGTGGAGCGGAGAACGCGCGTGGCATCGGCCCGG  
GTTCTGGGCTTCTGGGCGCGCGCGCTCCACCATGGGCGCGCTCCATCACCTGACCGTGCAGGCCCGCGCGATGCTGTCGGCATC  
TGCAGCAGCATCCAACCTGCTGCGGCCATCGAGGCCAGCAGCACCTGCTGGGCGATCTGGGCTGCTCCGCAAGTGTGCAACCAAGTGCAGGCCCGC  
GTGCTGGCGGTGAGCGTACCTGAAGGACCAAGTCCCGAGGACGAGATCTGGGCAACATGACCTGGATGGAGTGGGACAGGAGTCAACACTACCGACA  
TCATCTACTCCCTGATCGAGGAGTCCAGAACCCAGCAGAGAACAGCAGGAGTGTGSCCTGGACAAGTGGGCTCCCTGTGGAAAC  
TGGTTCGACATCACCAACTGGCTGTGTACATCAAGATCTTCAATGATCGTGGCGGCTGATCGGCTGCGCATCGTGTTCGCCGTGCT  
GTCCATCGTGAACCGGTGCGCAGGGCTACTCCCCCTGTCTTCCAGACCTGATCCCCAACCCCGCGGCCCGACCGCCGAGGGCA  
TCGAGGAGGAGGCGGAGCAGGACCGGACCGCTCCATCCGCTGGTGAACGGCTTCTGGCCCTGGCTGGGACGACCTGCGCTCCCTG  
TGCCTGTTCTTACCACCGCTGCGGACCTGATCCTGATCGCCCGCCAGCCTGGAGTGTGGGCGCGCGCGGCTGGAGGCCCTGAA  
GTACCTGTGAACCTGCTGCAGTACTGGGCGCAGGAGTGAAGAACTCCGCCATCTCCCTGCTGGACACCAACCGCATCGCCGTGGCGGAGG  
GCACCGACCGCGTGAATCGAGGTGGTGCAGCGCGTGTGCCGCGCATCTGAACATCCCCCGCGCATCCGCCAGGGCTTCGAGCGCGCCCTG  
CTGTAA

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Fig. 43A

2003 CON A2 Env

MRVMGTQRNYYQHLWRWGILLGMLIMCKATDLWVTVYYGVPVWKDADTTLFCASDAKAYDTEVHNWVWATHACVPTDPNPQEVNLENVTEDFN  
 MWKNNMVEQMHEDIISLWDQSLKPCVKLTPLCVTLNCSNANTNNTSTMEEEKNCYNITTELKDKTQKVYSLFYKLDVVQDDESNKSEYYR  
 LINCNTSAITQACPKVSFEPIPIHYCAPAGFAILCKDKPRFNGTSCNNSVSVQCTHGKIPVASTQLLNGSLAEGKVMIRSENITNNAKNI  
 IVQENKVPITCIRPNNTNRKSIREFGQAFYTNDIIGDIRQAHCNINKTKWNATLQKVAEQLREHFPNKTIIFTNSSGGDLIETTHSFNCG  
 GEFFYCNTTGLNSTWKNGTNNTEQMITLPCRIKQIINMWQVRGRAMYAPPIAGVIKCTSNITGIIITRDGGNNETETFRPGGDMRDNR  
 SELYKYVVKIEPLGVAPTRAKRRVVEREKRAVGMGAVFLGAGSTMGAASTITVQARQLLSGIVQQSNLLKAEQQHLLKLTWVG  
 IKQOARVLALERYLDQQLGIWCGSGKLICATVPWNSSWSNKTQEEIWNMTWLQWDEISNYTNIYKLLSESONQOEKNEQDILLALD  
 KWANLWNWENITNWLWYIRIFIMIVGGLIGLRIVAIISVNVNRVQGYSPLSFQIPTNPEGLDRPGRIEEGGEGQGRDRSIRLVSGFLALA  
 WDDLRSCLFSYHRLRDCILIAARTVELIGHSSILKGLRLGWGLKYLWNLLLYWGRELKNSAISLLDTIAVAVAEWTDRIEIGQRACRAIL  
 NIPRRIRQGFERALL\$

Fig. 44A

2003 CON B Env

MRVKGIRKNYYQHLWRWGTMLLGMLMICSAAEKLWVTVYYGVPVWKEATTTLFCASDAKAYDTEVHNWVWATHACVPTDPNPQEVNLENVTENE  
 NMWKNMVEQMHEDIISLWDQSLKPCVKLTPLCVTLNCTDEMNAATNTTIIYRWGEIKNCSEFNITTSIRDKVQKEYALFYKLDVVPIDND  
 NTSYRLISCNTSVITQACPKVSFEPIPIHYCAPAGFAILKCNCKFNGTGPTCTNVSTVQCTHGIRPVVSTQLLNGSLAEEVIRSENFDT  
 NAKTIIIVQLNESVEINCTRPNNTRKSIHIGPGRFYTTGEIIGDIRQAHCNISRAKWNNTLKQIVKKLREQFGNKTIVFNQSSGGDPEIVM  
 HSENCGGEFFYCNTTQLENSTWNGTWNNTGNITLPCRIKQIINMWQEVGKAMYPPIRGQIRCSSNITGLLLTRDGGNNETEIFRPGGDM  
 RDNWRSELYKYVVKIEPLGVAPTRAKRRVVEREKRAVGMGAVFLGAGSTMGAASTMTLVQARQLLSGIVQQSNLLRAIEAQHLLQ  
 LTVWGIKQOARVLAVERYLKDQQLGIWCGSKLICITAVPWNASWSNKSLEIWDNMTWMEWEREIDNYTSLIYTLIEESQOQKEKNEQE  
 LLELDKWASLWNWFDTITNWLWYIKIFIMIVGGLVGLRIVFAVLSIVNVNRVQGYSPLSFQTRLPAPRGPDPEGIEEGGERDRDRSGRLVDG  
 FLALIWDCLRSLCLESYHRLRDLIIIVTRIVELLGRGWELKYWNLLQYWSQELKNSAVSLNATAIAVAEGTDRVIEVQACRAILHI  
 PRRIRQGLERALL\$

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Fig. 43B

2003 CON A2 Env. seq. opt

ATGCGCGTGATGGGCAACCCAGCGCAACTACCAGCACCTGTGGCGCTGGGGCATCCTGATCCTGGGCATGCTGATCATGTGCAAGGCCACCGA  
CCTGTGGGTGACCGTGTACTACGGCGTGCCCGTGTGGAAGACGCCGACACACCTGTCTGCGCCTCCGACGCCAAGCCCTACGACACCG  
AGGTGCACAACGTGTGGCCACCCACCGCTGCGTGCCACCGACCCCAACCCAGGAGGTGAACCTGGAGAACGTGACCGAGGACTTCAAC  
ATGTGAAGAAACAACATGGTGGAGCAGATGCAGGAGACATCATCTCCCTGTGGGACCAAGTCCCTGAAGCCCTGCTGAAGTGAACCCCTT  
GTGCGTGACCCCTGAACCTGCTCCAACGCCAACAACCACTCCACCATGGAGGAGATCAAGAACTGCTCTTACAAACATCACCAACCGAGC  
TGCGGACAAAGACCCAGAGGTGTACTCCCTGTTTACAAGCTGGACGTGGTSCAGCTGGACGAGTCCAAAGTCCGAGTCCGAGTACTACTACCGC  
CTGATCAACTGCAACACCTCCGCCATACCCAGGCTGCCCCAAGGTGCTCTTCGAGGCCATCCCATCCACTACTGCGCCCCCGCGGCTT  
CGCCATCCTGAAGTGCAAGGACCCCGCTTCAACGGCACCGGCTCCTGCAACAAAGTGTCTCTCCGTGCAAGTGCACCCAGGCATCAAGCCCG  
TGGCCTCCACCCAGCTGCTGTAACGGCTCCTGGCCGAGGGCAAGGTGATGATCCGCTCCGAGAACATCAACAAAGCAGCAACGCAAGAACATC  
ATCGTGAGTTCAACAAGCCCGTGCATCCGCGAGGCCACTGCAACATCAACAAAGCAACCCGCAAGTCCAGTCCGCTTCGGCCCGGCGAGGCTT  
CTACACCAACGACATCATCGGCGACATCCGCGAGGCCACTGCAACATCAACAAAGCAACCCGCAAGTCCGCTTCGAGTCCGCTTCGAGTCCGCTT  
AGTGGCGGAGCACTTCCCAACAAGACCATCATCTTCAACCTCCGCGGCGACCTGGAGATCAACCAACACCGAGAGATGATCAACCTGCGG  
GGCGAGTTCTTACTGCAACACCAACCGGCTGTTCACCTCAACCTGGAGAACAGGACCAACCAACACCGAGAGATGATCAACCTGCGG  
CTGCCGATCAAGCAGATCATCAACATGTGGCAGCGCTGGCGCGGCTGTAAGCCCTCCATGACGCGGCTGATCAAGTGCACCTCCA  
ACATCACCGGCATCATCCTGACCCCGCAGCGGCAACAGAGACCGAGACCTTCGCGCCCGGCGGCGGAGATGCGGACAACTGGCGC  
TCCGAGCTGTACAGTACAAGTGTGAAGATCGAGCCCTGGCGTGGCCCGCCAGCGCGCGCTGGTGGAGCGCGAGAGCGG  
CGCGTGGGCATGGGCGCGTGTCTGGGCTTCTGGCGCGCGCGCTCCACCATGGCGCGCGCTCCATCACCTGACCGTGCAGGCCC  
GCCAGTGTCTCGGCATCGTGACGACGAGTCCACCTGTGAAGGCCATCGAGGCCAGCAGCACCTGCTGAAGTGAACCGTGTGGGGC  
ATCAAGCAGTGCAGGCCCGGTGTGGCCTGGAGCGCTACCTGCAGGACCGAGCAGTGTGGGCATCTGGGCTGCTCCGGCAAGCTGAT  
CTGCCACACCGTGCCTGGAACCTCCTCCTGGTCCAACAAGACCCAGGAGAGATCTGGAACAACATGACCTGGCTGCAGTGGGACAAGG  
AGATCTCCAACCTACACCAACATCATCTACAAGCTGTGGAGGAGTCCAGAACCCAGCAGGAGAGAACGAGCAGGACCTGCTGGCCCTGGAC  
AAGTGGGCCAACCTGTGGAACCTGGTCAACATCACCAACTGGCTGTGGTACATCCGCATCTTCATCATGATCGTGGCGGCTGATCGGCTT  
GCGCATCGTATCGCCATCATCTCCGTGTGAACCGCTGCGGAGGAGGCGGCGGAGCAGGCGCGGCTCCATCCGCTTCCAGATCCCCAACCCCGAGG  
GCCTGGACCGCCCGCGCATCGAGGAGGCGGCGGAGCAGGCGCGGCTGATCCCTGATCGCGCGCGGCGGCTTCCCTGGCCCTGGCC  
TGGGACGACCTGCGCTCCCTGTGCTCTTCTACACCGCTGCGGAGTGCATCCTGATCGCGCGCGGCGGCGGCTGCTGGGCTGCTGGGCGCA  
CTCCTCCCTGAAGGCGCTGCGCTGGCTGGGAGGCGCTGAATACCTGTGGAACCTGCTGTGTAAGTGGGCGCGGAGTGAAGAACTCCG  
CCATCTCCCTGCTGGACACCATCGCCGTGGCCGTGGCCGAGTGGACCGCGGCTGATCGAGATCGGCCAGCGCGCTGCGCGGCGCATCTG  
AACATCCCCCGCGCATCCGCCAGGGCTTCGAGCGCGGCTGCTGTAA





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Fig. 45A

2003 B.anc Env

MRVKGIRKNCQHILWRWGTMLLGMLMICSAENLWVTVYGVVPVWKEATTLFCASDAKAYETEVEHNVWATHACVPTDPNPQEVVLENTENF  
 NMWKNMVEQMHEDIISLWDQSLKPCVKLTPLCVTLNCTDLNATNSTNMYRWRGEIKNCSEFNITTSIRDKMQKEYALFYKLDVVPIDNN  
 TSYRLINCNTSVITQACPVSFEPIPIHYCTPAGFAILKCNCKKFGTGPCNVSTVQCTHGIRPVVSTQLLNGSLAEVEVIRSENFDTN  
 AKTIIVQLNESVEINCRPNNTNRKSIHIGPGRAFYATGEIIGDIRQAHCNLSRAKWNNTLKQVVTKLREQFDNKTIVFNPSGGDPEIVMH  
 SFCGGEFFYCNTTQLFNSTWNGTWNTEGNTILPCRIKQIINMWQEVGKAMYAPPIRGQIRCSSNITGLLLTRDGGNNETEIFRPGGGDMR  
 DNWRSELYKYKVVKIEPLGVAFTKAKRRVVQREKRAVGIGAMFLGFLGAAGSTMGAASMTLTVOARQLLSGIVQQQNNLLRAIEAQHLLQ  
 TVWGIKQARVLAVERYLRDQQLGIWCSGKLICTTVPWNASWSNKSLSDEIWNMTWMEWEREIDNYTGLIYTLIEESQOQEKNEQEL  
 LELDKWASLWNWFDTITNLWYIKIFIMIVGGLVLRIVEAVLSIVNRVROGYSPLSFQTRLPA PRGPDRPEGIEEGGERDRDRSGRLVNGF  
 LALIWDRLRLSLCLFSYHRLRLDLLLIVARIVELLGRRGWEALKYWNLLQYWSQELKNSAVSLNATAIAVAEGTDRVIEVVQACRAILHIP  
 RRIRQGLERALIIS

Fig. 46A

2003 CON C Env

MRVRGILRNCCQWIIWILGFWMMLICNVVGNLWVTVYGVVPVWKEAKTTLFCASDAKAYEKEVHNVWATHACVPTDPNPQEVVLENTENF  
 NMWKNMVDQMHEDIISLWDQSLKPCVKLTPLCVTLNCTNATNATNTMGEIKNCSEFNITTELDRKKQKVYALFYRLDIVPLNENNSYRLINC  
 NTSAITQACPVSFDPIPIHYCAPAGYAILKCNKTFNGTGPCNNVSTVQCTHGIRPVVSTQLLNGSLAEVEEIIIRSENLTNNAKTIIIVHL  
 NESVEIVCTRPNNNTNRKSIHIGPGQTFYATGDIIGDIRQAHCNISEDKWNKTLOKVSKLKEHFPNKTIKFEPSSGGDLEITTHSFNCRGEF  
 FYCNTSKLENSTYNSTNTITLPCRIKQIINMWQEVGRAMYAPPIAGNITCKSNITGLLLTRDGGKNNTEFRPGGGDMRDNRSELYKYKV  
 VEIKPLGIAPTAKARRVVEREKRAVGIGAVFLGFLGAAGSTMGAASITLTVOARQLLSGIVQQQNNLLRAIEAQHMLQLTWVGIKQLQTRV  
 LAIERYLKDQQLGIWCSGKLICTTAVPWNSSWSNKSQEDIWDNMTWMQWDREISNYTDTIYRLLEDSONQOQEKNEKDLLALDSWKNLWNW  
 FDTITNLWYIKIFIMIVGGLIGLRIIFAVLSIVNRVROGYSPLSFQTLTPNPRGPDRLGRIEEGGEQDRDRSIRLVSGFLALAWDDLRSLC  
 LESYHRLRDFILIAARAVELLGRSSRLRGLQRGWEALKYGLSLVQYWGLELKKSAISLLDTIAIAVAEGTDRIIELIQICRAIRNIPRRIRQ  
 GFEAALQS

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## Fig. 45B

2003 B. and Env. seq. opt

ATGCGCGTGAAGGGCATCCGCAAGAACTGCCAGCACCTGTGGCGCTGGGGCACCATGCTGCTGGGCATGCTGATGATCTGCTCCGCCGCCGA  
GAACCTGTGGGTGACCGTGTACTACGGCGTGCCTGTGGAAGAGGGCCACACACCTGTTCTGCGCTCCGACGCCAAGGCCCTACGAGA  
CCGAGGTGCACAACTGTGGGCCACCCACCGCTGCTGCCACCGACCCCAACCCAGGAGGTGCTGGAGAACGTGACCGAGAACTTC  
AAATGTGGAAGAACAACTGTGGAGAGATGACGAGGACATCATCTCCTGTGGACCACTCCCTGAAGCCCTGCTGAGCTGACCCCTC  
CCTGTGCGTGACCTGAACCTGCACCGACCTGCTGAACGCCACCAACCACTCCACCAATGATACCGCTGGCGGGGAGATCAAGAACT  
GCTCCTTCAACATCACCACTCCATCCGCGACAAGATGAGAAGAGTACGCTGTTTACAAGCTGGACGTGGTGGCCATCGACAACAAC  
ACCTCTACCGCTGATCAACTGCAACACCTCCGTGATCACCGGCTGCCCAAGGTTCCTTCGAGCCCATCCCATCCACTACTGAC  
CCCCCGCGCTTCGCCATCCTGAAGTGCAACGACAAGAGTTCAACGGCACCGGCCCTGCAAGAACGTGTCCACCGTGCAGTCAACCCACG  
GCATCCGCCCTGCTGTCACCGCTCCCTGGCCGAGGAGGTGGTGTATCCGCTCCGAGAACTTCACCGAACCTTCACCGAAC  
GCCAAGACCATCATCGTGACGTGAACGAGTCCGTGGAGATCAACTGCACCCCGCCCAACAACAACCTGTCCCGGCAAGTCCATCCACATCGGCC  
CGCCCGCTTCTACGCCACCGCGGAGATCATCGCGACATCCGCCAGGCCACTGCAACCTGTCCCGGCAAGTCCATCCACATCGGCC  
AGCAGGTGGTGACCAAGCTGCGCGAGCATCTGACAAACAAGACCATCGTGTTCACCTCTCCGGCGGACCCCGAGATCGTGTGAC  
TCCTTCAACTGCGCGGAGTTCTTACTGCAACACCCAGCTGTTCACCTCCACCTGGAAACGGCACCTGGAAACAACCGAGGGCAA  
CATACCTCTGCGCGCATCAAGCAGATCATCAACATGTGGCAGGAGTGGCAAGGCCATGTACGCCCTCCCATCCCGGCCAGATCC  
GCTGCTCCTCCAACTACCGGCTGCTGTACCCGACGGCGCAACAACGAGACCGAGATCTTCGCCCTCCCGGCCGCGACATGCGC  
GACAACTGGCGCTCCGAGCTGTACAAGTACAGGTGTGAAGATCGAGCCCTTGGCGTGGCCCAACCAAGGCCAAGCGCCGCTGGTGA  
GCCGAGAAGCGCGCTGGCATCGCGCATGTTCTGGCTTCCTGGCGCCCGCGCTCCACCATGGCGCCGCTCCATGACCTGA  
CCGTGCAGGCCCGCGCTGTGTCCGGCATCGTGACGACGACAACCTGCTGCGCGCATCGAGGCCACGACGACCTGCTGCAGCTG  
ACCGTGTGGGCGATCAAGCAGCTGACGGCCCGCTGCTGGCGCTGAGCGCTACCTGCGCGACCGACGAGCTGCTGGCATCTGGGCTGCTC  
CGCAAGCTGATGTGACCAACACCGTGGACCGCTCCTGGTCCAACAGTCCCTGGACGAGATCTGGAACAACATGACCTGGATGG  
AGTGGAGCGCGAGATCGACAACCTACACCGCTGATCTACACCTGATCGAGGAGTCCAGAACCGACGAGGAGAACGACGAGGAGCTG  
CTGGAGCTGGACAAGTGGGCTCCCTGTGGAACCTGCTGACATCAACCTGCTGTGTAACATCAAGATCTTCATGATCGTGGCGG  
CCTGTGGGCTTGCGCATCGTGTGCGCGTGTCCATCGTGAACCGCTGCGCCAGGCTACTCCCCCTGTCTTCCAGACCCGCTGC  
CCGCCCGCGCGACCGCCCGAGGGCATCGAGGAGGCGCGGACCGGACCGCTCCGGCCGCTGGTGAACGGCTTC  
CTGGCCCTGATCTGGACGACCTGCGCTCCCTGTGCTGTTCTCTACACCGCTGCGGACCTGCTGTGATCGTGGCCCGCATCGTGGA  
GCTGCTGGCGCGCGGCTGGAGGCTTGAAGTACTGTGTGAACCTGCTGCACTGCTGCTCCAGGAGCTGAAGAACTCCGCCGTGCTCC  
TGCTGAACGCCACCGCCATCGCCGTGGCGGAGGCAACCGCGGTGATCGAGGTGGTGAAGCGGCTGCGCGCCATCCTGACATCCCC  
CGCCGCTCCGCCAGGGCTGGAGCGGCGCTGCTGTAA

**Fig. 46B**

2003 CON C Env. seq. opt

ATGCGGTGCGGGCATCCTGGCAACTGCCAGCAGTGGTGATCTGGGGCATCCTGGGCTTCTGGATGCTGATGATCTGCAACGTGGTGGG  
CAACCTGTGGTGACCGTGTAACGGGTGCCCGTGTGGAAGGAGGCCAAGACCACCTGTCTGCGCCTCCGACGCCAAGGCTACGAGA  
AGGAGGTGCACAACGTGTGGCCACCCACCGCTGCTGCCACCGACCCCAACCCAGGAGATCTGCTGGAGAACGTGACCGAGAACTTC  
AAACATGTGAAGAACGACATGTTGACCCAGATGCACGAGGACATCATCTCCCTGTGGACCAAGTCCCTGAAGCCCTGCGTGAAGCTGACCCC  
CCTGTGCGTGACCTGAACCTGCACCAACGCCACCAACCAACCATGGCGAGATCAAGAACTGCTCCTTCAACATCACCAACCGAGC  
TGCGCGACAAGAGCAGAAGTGTACGCCCTGTTCACCGCTGGACATCTGTCGCCCTGAACGAGAACAACTCTACCGCTGATCAACTGC  
AAACACCTCCGCCATCACCAAGCTGCCCAAGTGTCTTCGACCCCATCCCCATCCACTACTGCGCCCGCCGCTACGCCATCCTGA  
GTGCAACAACAAGACCTTCAACGGCACCGGCCCTGCAACAACGTGTCCACGTGCAGTGCACCCACGGCATCAAGCCGTGGTGTCCACCC  
AGCTGCTGTAACGGTCCCCTGGCGGAGGAGATCATCATCCGTCCGAGAACTTGACCAACAACGCCAAGACCATCATCTGTGCACCTG  
AAACGAGTCCGTGAGATCTGTGCACCCCGCCCAACAACAACCCGAAGTCCATCCGCATGGCCCCCGCCAGACCTTCTAGGCCACCCG  
CGACATCATCGGCGACATCCGCCAGGCCACTGCAACATCTCCGAGGACAAGTGGAAACAAGACCTGCAAGAAAGTGTCCAAGAAAGCTGAAGG  
AGCACTTCCCAACAAGACCATCAAGTTCGAGCCCTCCTCGGGCGGACCTGGAGATCACCAACCACTCTTCAACTGCCGCGGAGGTTCT  
TTCTACTGCAACACCTCCAAGCTGTTCAACTCCACTCAACACTCACCTGCCCTGCCGCATCAAGCAGATCATCA  
CATGTGGCAGGAGTGGCGCGGCATGTACGCCCCCCCATCGCCGCAACATCACCTGCAAGTCCAACATCACCGGCCTGCTGCTGACCC  
GCGACGGCGGCAAGAACACCGAGACCTTCGGCCCCGGCGGACATGCGCGACAACTGGCGCTCCGAGCTGTACAAGTACAAGTG  
GTGGAGATCAAGCCCTGGGCATCGCCCCCACCAGGCCAAGCGCCGCTGGTGAGCGGAGAAAGCGCCGCTGGGCATCGCGCCGCTGT  
CCTGGGCTTCTGGGCGCCCGCGCTCACCATGGCGCGCCCTCCATCACCTGACCGTGCAGGCCCGCCAGCTGCTGCCGCATCGTGC  
AGCAGCAGTCCAACCTGTCGCGCCATCGAGGCCACGACATGCTGACGTGACCGTGTGGGGCATCAAGCAGCTGCAGACCCCGCTG  
CTGGCCATCGAGCGTACCTGAAGACACGACGTGCTGGGCATCTGGGCTGCTCCGGCAAGCTGATCGACCAACCGCCGTGCCCTGGAA  
CTCCTCCTGTTCCAACAAGTCCAGGAGGACATCTGGACAACATGACCTGGATGCAGTGGACCGCGAGATCTCAAATACACCGACACCA  
TTACCGCTGCTGGAGGACTCCAGAACCCAGGAGAAAGAACGAGAACCTGCTGGCCCTGGACTCCTGGAAGAACCTGTGGAACCTGG  
TTTCGACATCACCAACTGGTGTGTAATCAAGATCTTCATCATGATCGTGGCGGCTGATCGGCCCTGCGCATCATCTTCGCCGTGCTGTC  
CATCTGTAACCGCTGCGCCAGGGCTACTCCCCCTGTCTTCCAGACCTGACCCCCAACCCCCCGGCCCGCCGCTGGGCGCCGATCG  
AGGAGGAGGGCGCGAGCAGGACCGGACCGCTCCATCCGCCCTGGTGTCCGGCTTCTTGGCCCTGGGACGACCTGGCGTCCCTGTGTC  
CTGTTCTCTACCAACCGCTGCGGACTTCATCTGATCGCCCGCGCGGTGGAGCTGCTGGCGCGCTCCCTCCCTGCGCGGCTGACGG  
CGGCTGGAGGCCCTGAAGTACCTGGGCTCCCTGGTGCAGTACTGGGGCTTGGAGTGAAGAGTCCGCCATCTCCCTGCTGGACACCATCG  
CCATCGCCGTGGCGGAGGCCACCGCATCATCGAGCTGATCCAGCGCATCTGCCGCGCATCCCGCGCATCCCGCGCATCCGCCAG  
GGCTTCGAGGCCGCCCTGCAGTAA

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Fig. 47A

## 2003 C.anc Env

MRVMGILRNCQQWMIWGILGFWMLMNCVVGNLWVTYYGVVPVWKEAKTTLFCASDAKAYEREVHNVWATHACVPTDPNPQEMVLENTENF  
 NMWKNMDVDMHEDIISLWDQSLKPCVKLTPLCVTLNCTNATNATMGEMKNCSFNITTELRDKKQKVYALFYRLDIVPLNDNNSYRLINC  
 NTSAITQACPKVSFDPIPIHYCAPAGYAILKCNKTFNGTGPCNNVSTVQCTHGKIPVSTQLLNGSLAAEEIIIRSENLTDNAKTIIVHL  
 NESVEIVCTRPNNNTRKSIRIGPGQTFYATGDIIGDIRQAHCNISEEKWNKTQRVGEKLEHFPNKTIKFAPSSGGDLEITTHSFNCRGEF  
 FYCNTSRLEFNSTYNSKNSTITLPCRICKQIINMWQGVGRAMYAPPIAGNITCKSNITGLLLTRDGGKNNTETFRPGGDMRDNRNWRSELYKYKV  
 VEIKPLGIAPTEAKRRVVEREKRAVGIGAVFLGELGAAGSTMGAASITLTQVQARQLLSGIVQQSNLLRAIEAQHMLQLTVWGIKQLQTRV  
 LAIERYLKDQQLLGIWGCCKLICCTTAVPWNSSWSNKSQEEIWDNMTWQWDREISNYTDTIYRLLEDSONQQEKNEQDLLALDSWENLWNW  
 FDI TNWLWYIKIFIMIVGGLIGLRIIFAVLSIVNRVQGYSPLSFQTLTPNPRGPDRLGRIEEEGEGEDRDRSIRLVSGFLALAWDDLRLSLC  
 LFSYHRLRDFILIAARAVELLGRSSRLGRGLQRGWEALKYLGSLVQYWGLELKKSAISLLDTIAIAVAEGTDRIIELIQRICRAIRNIPRRIRQ  
 GFEAALL\$

Fig. 48A

## 2003 CON D Env

MRVRGIQRN̄YQHLLWRWGIMLLGMLMICSVAENLWVTYYGVVPVWKEATTLFCASDAKSYKTEAHNIWATHACVPTDPNPQEIENVTENF  
 NMWKNMVEQMHEDIISLWDQSLKPCVKLTPLCVTLNCTDVKRNTSNDTNEGEMKNCSFNITTEIRDKKKQVHALFYKLDVVPIDDDNNSNT  
 SYRLINCNTSAITQACPKVTFEPIPIHYCAPAGFAILKCKDKKFGTGPCKNVSTVQCTHGIRPVSTQLLNGSLAAEEIIIRSENLTNNA  
 KIIIVQLNESVTINCTRPYNNTRQRTPIGPGQALYTTRIKGDIRQAHCNISRAEWNKTLOQVAKKLGDLNKTIIIFKPSSGGDPEITTHSF  
 NCGEFFYCNTSRLEFNSTWNNTKWNSTGKITLPCRICKQIINMWQGVGRAMYAPPIEGLIKCSSNITGLLLTRDGGANNSHNETFRPGGDMR  
 DNWRSELYKYKVVKIEPLGVAPTRAKRRVVEREKRAIGLGAMELGLGAGSTMGAASMTLTQVQARQLLSGIVQQONNLLRAIEAQHLLQL  
 TVWGIKQLOARILAVERYLKDQQLGIWGCCKHICTTVPWNSSWSNKSLEIWNMTWMEWEREIDNYTGLIYSLIEESONQOEKNEQEL  
 LEIDKWSLWNWFSITQWLWYIKIFIMIVGGLIGLRIVFAVLSLVNRVQGYSPLSFQTLPPAPRGPDPRPEGIEEGEGEQGRGRSIRLVNGF  
 SALIWDDLRLNLCFSYHRLRDLILIAARIVELLGRRGWEALKYLNLLQYWIQELKNSAISLFDTTAIAVAEGTDRVIEIVQACRAILNIP  
 TRIRQGLERALL\$

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## Fig. 47B

## 2003 C. anc Env. seq. opt

ATGCGGTGATGGGCATCTGCGCAACTGCCAGCAGTGGTGATCTGGGGCATCTGGGCTTCTGGATGCTGATGATCTGCAACGTGGTGGG  
CAACCTGTGGGTGACCGTGTACTACGGCGTGGCCGTGGAAGAGGCCAAGACCAACCTGTCTGCGCCTCCGAGCCCAAGGCCCTACGAGC  
GCGAGGTGCACAACGTGTGGGCCACCCACCGACCCCAACCCAGGAGATGGTGTGGAGAACGTGACCGAGAACTTC  
AACATGTGGAAGAACGACATGGTGACCAAGCATGACGAGGACATCATCTCCCTGTGGGACCATGAAGAACTGCTCCTTCAACATCACCCAGC  
CCTGTGCGTGACCTGAACCTGCAACGACCAACGACCAACCATGGGCGAGATGAAGAACTGCTCCTTCAACATCACCCAGC  
TGCGGACAAAGACGAAAGGTGTACGCCCTGTCTACCGCTGGACATCGTGGCCCTGAACGACAACTCCTACCGCTGATCAACTGC  
AACACCTCCGCCATCACCCAGGCTGCCCCAAGGTGCTTTCGACCCCATCCCATCCACTACTGGGCCCCCGCGCTAGCCATCCTTGAA  
GTGCAACAACAAGACCTTCAACGGCACCGGCCCTGCAACAACGTGTCCACCGTGAGTGACCCAGCATCAAGCCCGTGGTGTCCACCC  
AGCTGCTGCTGAACGGCTCCTGGCCGAGGAGGATCATCATCCGCTCCGAGAACCTGACCGCAACGCCAAGACCATCATCGTGCACTG  
AACGAGTCCGTGGAGATCGTGTGCACCCGCCCAACAACAACCCGCAAGTCCATCCGATCGGCCCGGCGAGACCTTCTACGCCACCGG  
CGACATCATCGGCGACATCCGCCAGGCCCACTGCAACATCTCCGAGGAGAGTGGAAACAAGACCTGACGCGCTGGGCGAGAACTGAAGG  
AGCACTTCCCCAACAAGACCATCAAGTTGCCCCCTCTCCGGCGGCGACCTGGAGATCACCAACCCACTCCTTCAACTGCCGCGGAGTTTC  
TCTACTGCAACACCTCCCGCTGTTCAACTCCAACTCCAACTCCACCATCACCTGCCCTGCCGATCAAGCAGATCATCAA  
CATGTGGCAGGGCTGGGCCGCGCATGTACGCCCCCGCATGCCGCAACATCACCTGCAAGTCCAACTCACCGGCTGCTGCTGACCC  
GCGACGGCGCAAGAACACAACCGAGACCTTCCGCCCGCGGCGGACATGCGGCAACTGGCGCTCCGAGCTGTAAGTACAAGTG  
GTGAGATCAAGCCCTGGGCGATCGCCCAACGAGGCAAGCGCGCGTGGTGGAGCGGAGAGCGCGCTGGGCGATCGGCGCGCTGT  
CCTGGGCTTCTGGGCGCGCGCTCCACCATGGGCGCGCTCCATCACCTGACCGTGACGCGCGCGCTGCTGCCGATCGTGC  
AGCAGATCCAACTGCTGCGCGCATCGAGGCCAGCAGCATGCTGCAGCTGACCGTGTGGGCGATCAAGCAGCTGCAGACCCCGCTG  
CTGGCCATCGAGCGCTACCTGAAGACAGCAGCTGCTGGGCGATCTGGGCTGCTCCGCAAGTGCATCTGCACCCCGCTGCCCTGGAA  
CTCCTCCTGTTCCAAAGTCCAGGAGGATCTGGGACAACTGACCTGGATGACGTGGACCGCGAGATCTCCAACATACCCGACACCA  
TTCAGACATCACCAACTGGCTGTGGTACATCAAGATCTTCAATGATCGTGGCGGCTGATCGGCTCCGAGAACCTGTGGAACTGG  
CATCGTGAACCGGTGCGCCAGGGCTACTCCCCCTGTCTTCCAGACCTGACCCCAACCCCGCGGCTCCGAGAACCTGTGGCGCATCG  
AGGAGGAGGGCGGAGCAGGACCGGACCGCTCCATCCGCTGGTCCGGCTTCTGGCCCTGGCCCTGGGACGACCTGGGCTCCCTGTGC  
CTGTTCTCTACCAACCGCTGCGGACTTCATCCCTGATCGCCCGCGCGCTGGAGTGTGGGCGCTCCCTCCCTGGCGGCTGCAGCG  
CGGCTGGGAGGCCCTGAAGTACCTGGGCTCCCTGGTGCAGTACTGGGCGCTGGAGCTGAAGAGTCCGCCATCTCCCTGCTGACACCATCG  
CCATCGCGCTGGCGGACCGGACCGCATCATCGAGCTGATCCAGCGCATCTGCCGCGCATCCGCAACATCCCCCGCGCATCCGCCAG  
GGCTTCGAGGGCGCCCTGCTGTAA

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## Fig. 48B

2003 CON D Env. seq. opt

ATGCGCGTGCAGCGCATCCAGCGCAACTACCAGCACCTGTGGCGCTGGGGCATCATGCTGTGGCATGTGATGATCTGCTCCGTGGCCGA  
 GAACCTGTGGGTGACCGTGTACTACGGCGTGCCCGTGTGGAAGAGGCCACACCACTGTGTCTGCGCTCCGAGGCCAAGTCTACAGA  
 CCGAGGCCACAAACATCTGGGCCACCCACGCTGCGTGCCACCGACCCCAACCCAGGAGATCGAGCTGGAGAACGTGACCGGAACTTC  
 AACATGTGGAAGAACAAACATGGTGGAGCAGATGCAGAGACATCATCTCCCTGTGGGACCACTCCCTGAAGCCCTGCGTGAAGCTGACCCC  
 CCTGTGCGTGACCTGAACCTGACCGACCGTGAAGCGCAACACACCTCAACGACACCAACGAGGCGGAGATGAAGAACTGCTCTTCAACA  
 TCACCAACGAGATCCGCGACAAGAAAGAGCAGGTGCACGCCCTGTCTACAAAGCTGGACGTGGTGCCTCGACGACAACTCCAAACACC  
 TCCTACCGCTGATCACTGCAACACCTCCGCCATCACCCAGGCTGCCCAAGGTGACCTTCGAGCCCATCCCATCCACTACTGCGCCCC  
 CGCCGCTTCGCCATCCTGAAGTGCAGGACAAGAGTTCAACGGCACCGGCCCTGCAAGAACGTGTCCACCGTCCAGTGCACCCACGGCA  
 TCCGCCCGTGGTGTCCACCCAGCTGCTGTGAACGGCTCCCTGGCCGAGGAGAGATCATCTCCGCTCCGAGAACCTGACCAACAGGCC  
 AAGATCATCTGTCAGCTGAACGAGTCCGTGACCATCAACTGCACCCCGCCCTACAAACAACACCCGCGAGCGACCCCATCGGCCCGG  
 CCAGGCCCTGTACACCAACCCGATCAAGGCGACATCCGCGAGGCCACTGCAACATCTCCGCGCGAGTGGAAACAAGACCTGCAGCAGG  
 TGGCCAAGAAGCTGGCGACCTGTGAACAAGACCACTCATCTTCAAGCCCTCCTCCGGCGGACCCCGAGATCAACACCACTCCTTC  
 AACTGCGGCGGAGTTCTTCTACTGCAACACCTCCCGCTGTTCACCTCCAGCAACACCAAGTGGAACTCCACCGGCAAGATCAC  
 CCTGCCCTGCCGCATCAAGCAGATCATCAACATGTGGCAGGCGGTGGCAAGGCCATGTACGCCCCCATCGAGGCCCTGATCAAGTGCT  
 CCTCCAACATCACCGGCTGCTGACCCGCGACGGCGGCCAACAATCCCAACAACGAGACCTTCGCCCCCGGCGGCGACATGCGC  
 GACAACTGGCGTCCGAGCTGACAAGTACAAGTGTGAAGATCGAGCCCTGGCGTGGCCCCCAACCGCGCCAAAGCGCGCGTGGTGA  
 GCGGAGAAGCGGCCATCGGCCCTGGCGCCATGTTCTTGGGCTTCTGGGCGCGCGGCTCCACCATGGGCGCGCCTCCATGACCCCTGA  
 CCGTGACGGCCCGCAGCTGCTCCGGCATCGTGACGACGAGAACAACTGCTGCGCGCATCGAGGCCAGCAGCACCTGCTGCAGCTG  
 ACCGTGTGGGCATCAAGCAGCTGCAGGCCCGCATCCTGGCCGTGGAGCGCTACTGAAGGACGAGAGCTGTGGCATCTGGGCTGCTC  
 CGCAAGCATCTGCACCAACCCGTGCCCTGGAACTCCTCTGGTCCAAAGTCCCTGGACGAGATCTGGAACAACATGACCTGGATGG  
 AGTGGAGCGCGAGATCGACAACCTACACCGGCTGATCTACTCCTGATCGAGGAGTCCCAAGAACAGCAGGAGAGAACGAGCAGGAGCTG  
 CTGGAGCTGGACAAGTGGGCTCCCTGTGGAACTGGTTCTCCATCACCCAGTGGCTGTGGTACATCAAGATCTTATCATGATCGTGGCGG  
 CCGCTGCGGCTGCGCATCGTGTTCGCCGTGCTGCCGTGTAACCGCGTGGCGGAGGCGGCGAGCGGCGGCTCCATCCGCTGGTGAACGGCTTC  
 CCGCCCTGATCTGGACGACCTGCGCAACCTGTGCTGTCTCCTACACCGCTGCGGACCTGATCCTGATCGCGCGCGGATCGTGGA  
 GTGTGGCGCGCGGCTGGAGGCCCTGAAGTACCTGTGAACCTGTGCACTGATCCAGGAGTGAAGAACTCCGCCATCTCCC  
 TGTTCGACACCAACCGCATCGCCGTGGCCGAGGCGACCGCGGTGATCGAGATCGTGACGCGGCTGCGCGGCTCCTGAAACATCCCC  
 ACCCGCATCCGCCAGGCGCTGGAGCGCGCCCTGCTGTAA

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Fig. 49A

2003 CON F1 Env

MRVRGMQRN̄WQH LGKWGLLEFLGILLIICNAADNLWTVVYGVVPWKEATTTLCASDAKSYEKEVHNWVWATHACVPTDPNPQEVVLENVTFENF  
 DMWKNNMVEQMHTDIISLWDQSLKPCVKLTPLCVTLNCTDVNATNNDTNDNKTGAIONCSFNMTTEVRDKKLKVHALFYKLDIVPI SNNNNSK  
 YRLINCNTSTITQACPKVSWDPIPIHYCAPAGAYAILKCNDRFNGTGPCKNVSTVQCTHGKIPVSTQLLINGSIAEEDIIRSQNISDNNAK  
 TIIVHLNESVQINCTRPNNNTRKSIHLGPGQAFYATGEIIGDIRKAHCNISGTQWNKTLEQVKAKLKSHPNKTIKFNSSSGGDLLEITMHSF  
 NCRGEFFYCNTSGLENDTGSNGTITLPCRIRQFVNMWQEVGRAMYAAPIAGNITCNSNITGLLLTRDGGQNNTEFRPGGNNMKDNWRSELY  
 KYKVEIEPLGVAPTAKRQVVKRERRAVGIGAVFLGFLGAAGSTMGAASITITVQARQLLSGIVQQNNLLRAIEAQOHLLOLTVWGIKQL  
 QARLAVERYLKDQQLLGLWCSGKLICTTNVPWNSSWSNKSQDEIWNMTWMEWEKEISNYSNIIYRLIEESQNOQEKNEQELLALDKWAS  
 LWNWFDISNWLWYIKIFIMIVGGLIGLRIVFAVLSIVNRVRKGYSPLSLQTLIPSPREPDRPEGIEEGGEGQCKDRSVRLVNGFLALVWDDL  
 RNLCLEFSYRHLRDFILIAARIVDRGLRRGWEALKYLGNLTOYWSQELKNSAISLINTTAIVVAEGTDRVIEALQRAGRAVLNIPRRIRQGLE  
 RALL\$

Fig. 50A

2003 CON F2 Env

MRVREMQRN̄WQH LGKWGLLEFLGILLIICNAADNLWTVVYGVVPWKEATTTLCASDAKAYEREVHNWVWATYACVPTDPSQELVLGNVTENF  
 NMWKNNMVDQMHTDIISLWDQSLKPCVKLTPLCVTLNCTDVNVTINTNVTLGEIKNCSEFNITTEIKDKKKKEYALFYRLDVVPINNNSIVYR  
 LISCNTSTVTOACPKVSFEPIPIHYCAPAGAYAILKCNDRFNGTGLCRNVSTVQCTHGIRPVVSTQLLINGSIAEEDIIRSENISDNKTII  
 IVQENRSVEINCTRPNNNTRKSIHIGPGRAFATGDIIGDIRKAYCNINRTLWNETLKKVAEEFKNHENITVTFNPSSGGDLLEITTHSFNCR  
 GEFYCYNTSDLENNTEVNNTKTIITLPCRIRQFVNMWQEVGRAMYAPPYAGQIQCNISNITGLLLTRDGGKNGSETLRPGGDMRDNRSELYK  
 YKVKIEPLGVAPTAKRQVVKRERRAVGIGAVLLGFLGAAGSTMGAASITITVQARQLLSGIVQQNNLLKAIEAQOHLLOLTVWGIKQLQ  
 ARILAVERYLKDQQLLGIWCSGKLICTTNVPWNSSWSNKSQDEIWNMTWMEWEKEISNYTDIYRLIEDAQNOQEKNEQDLALDKWDNL  
 WSWFTITNLWYIKIFIMIVGGLIGLRIVFAVLSIVNRVRQYSPLSLQTLIPNPRGPERPGEIEEGEGQDRDRSIRIVSGFLALAWDDL  
 SLCLFSYRHLRDFILIAARTVDMGLKRGWEALKYLWNLPOYWGQELKNSAISLDDTTAIAVAEGTDRIIEVLQRAGRAVLHIPRRIRQGFER  
 ALL\$

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Fig. 49B

2003 CON F1 Env.seq.opt

ATGCGGTGCGGGCATGAGCGCAACTGGCAGCACCTGGGAAGTGGGGCTGCTGTTCTTGGGCATCTGATCATCTGCAACGCCGCCGA  
 GAACCTGTGGGTGACCGGTGTAACGGCGTGCCCGTGTGAAGAGGCCACCAACACCTGTTCTGGCCCTCCGACGCCAAGTCTACGAGA  
 AGGAGGTGCACAACGTGTGGGCCACCCACCGCTGCGTGCCACCGACCCCAACCCAGGAGGTGTGCTGGAGAACGTGACCGAGAACTTC  
 GACATGTGAAGAACAACATGGTGGAGCAGATGCACACCGACATCATCTCCCTGTGGGACAGTCCCTGAAGCCCTGCGTGAAGCTGACCC  
 CCTGTGCGTGACCTGAACCTGCACCGACGTGAACGCCACCAACAGCACCAACGACCGGCCCATCCAGAACTGCTCTTCA  
 ACATGACCAACCGAGGTGGCGACAGAAGCTGAAGTGCACGCCCTGTTCTAACAGCTGGACATCGTGCCCATCTCCAACAACACTCCAAG  
 TACCGCTGATCAACTGCAACACCTCCACCATCAACCGAGCCCTGCCCAAGGTGTCTGTGGACCCCATCCCCATCCACTACTGCGCCCCCGC  
 CGGTACGCCATCCTGAAGTGAACGACAAAGCCTTCAACGGCACCGGCCCTGCAAGAACGTGTCCACCGTGCAGTGCACCCACGGCATCA  
 AGCCGTGTGTCCACCCAGCTGTGTGAACGGTCCCTGGCCGAGGAGGACATCATCATCCGTCCAGAACATCTCCGACAAACGCCAAG  
 ACCATCATCGTGCACTGAACGAGTCCGTGCAGATCAACTGCACCCGCCCAACAACAACCCGCAAGTCCATCCACTGGGCCCGCGCCA  
 GGCTTCTACGCCACCGCGGAGATCATCGGCGACATCCGCAAGGCCCACTGCAACATCTCCGGACCCAGTGGAAACAAGACCTGGAGCAGG  
 TGAAGGCCAAGCTGAATCCCACTTCCCCAACAAAGACCATCAAGTTCACTCTCTCCGGCGGCGACCTGGAGATCACCATGCACCTCTTC  
 AACTGCCGCGGAGTCTTCTACTGTGAACACCTCCGGCTGTTCAGACACCGGCTCCAACGGCACCATCACCTGCCCTGCCGCAATCAA  
 GCAGATCGTGAACATGTGGCAGGAGTGGCGCGCCCATGTACGCCGCCCATCGCCGGCAACATCACCTGCAACTCCAACATCACCGGCC  
 TGCTGTGACCCGCGACGGCGGCCAGAACAAACCGAGACCTTCGGCCCCGGCGGGCAACATGAAGGACAACACTGGCGCTCCGAGCTGTAC  
 AAGTACAAGGTGTGAGATCGAGCCCTGGCGTGGCCCCCAAGGCCAAGCGCCAGTGGTGAAGCGCGAGCGCCGCGCTGGGCAT  
 CGCGCGCGTGTCTGGGCTTCTGGGCGCGCGCGCTCCACCATGGCGCGCCCTCCATCACCTGACCGTGCAGGCCCGCCAGCTGCTGT  
 CCGGCATCGTGACGACGAAACACCTGTGCGCGCCATCGAGGCCACGACACCTGTGAGCTGACCGTGGGGCATCAAGCAGCTG  
 CAGGCCCGCGTGTGCCGTGGAGCGTACTGAAGGACCGAGCTGTGGGCTGTGGGCTGTCCGGCAAGCTGATCTGCACCAACAA  
 CGTGCCCTGGAACCTCTCTGTTCCAAAGTCCAGGACGAGATCTGGAACAACATGACCTGGATGGAGTGGGAGAGGAGATCTCCAACT  
 ACTCCAACATCATCTACCGCTGATCGAGGAGTCCAGAACCGAGAGAGAACAGCAGGAGCTGTGGCCCTGGACAAGTGGGCCCTCC  
 CTGTGGAACCTGTTCCACATCTCCAACCTGTGTGATCAAGATCTTTCATCATGATCGTGGCGGCTGATCGGCTGCCCATCGTGT  
 CGCCGTGCTGTCCATCGTGAACCGCGTGCAGAGGCTACTCCCCCTGTCCCTGCAGACCCCTGATCCCCCTCCCGCGGAGCCCGCC  
 CCGAGGGCATCGAGGAGGGCGGCGAGCAGGCAAGGACCGCTCCGTGCGCTGTGTGAACGGCTTCTGCGCCCTGTGTGGGACGACCTG  
 CGCAACCTGTGCTTCTCTACCGCCACCTGCGCGACTTCATCTGATCGCGCCCGCATCGTGGACCGCGGCTGCCCGCGGCTGGGA  
 GGCCCTGAAGTACCTGGGCAACCTGACCCAGTACTGTTCCAGGAGCTGAAGAACTCCGCCCATCTCCCTGCTGAACACCAACCGCATCGTGG  
 TGGCCGAGGGCACCGCGTGTATCGAGGGCCCTGACGGCGCGCGCGCTGTGTGAACATCCCCCGCCGCATCCGCCAGGGCCTGGAG  
 CGCGCCCTGCTGTAA



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Fig. 50B

2003 CON F2 Env. seq. opt

ATGCGGTGCGGAGATGCAGCGCAACTGGCAGCACCTGGGCAAGTGGGGCTGTGTTCTTGGGCATCCTGATCATCTGCAACGCCGCCGA  
 CAACCTGTGGGTGACCGTGTACTACGGCGTCCCCGTGTGAAGAGGCCACACACACCTGTCTGCGCTCCGACGCCAAGCCCTACGAGC  
 GCGAGGTGCACAACCTGTGGCCACCTACGCCCTGGTGCCACCGACCCCTCCCCCAGGAGCTGGTGGCAACCTGACCGAGAACTTC  
 AACATGTGAAGAAACAACATGGTGGACAGATGCACGAGGACATCATCTCCCTGTGGACCACTCCCTGAAGCCCTGCGTGAAGCTGACCCC  
 CCTGTGCGTGACCCCTGAACCTGACCCGACGTGAACGTGACCATCAACACCAACCAACCTGGCGGAGATCAAGAACTGCTCCTTCAACA  
 TCACACCGAGATCAAGGACAAGAAAGAGTACGCCCTGTTCTACCGCTGGACGTGGTGGCCATCAACAACTCCATCTGTGTACCGC  
 CTGATCTCCTGCAACACCTCCACCGTGACCCAGGCTGCCCAAGGTGCTCTTGGAGCCCATCCCCATCCACTACTGGCCCCCGCGGCTT  
 CGCCATCCTGAAGTGAACGACAAGAAAGTTCAACGSCACCGCTGTGCGCAACGTGTCCACCGTGCAGTGCACCCAGGCAATCCGCCCG  
 TGGTGTCAACCCAGCTGCTGAACGGCTCCCTGGCCGAGGAGACATCATCCGCTCCGAGAAACATCTCCGACAAACCAAGACCATC  
 ATCGTGAGTTCAACCGCTCCGTGGAGATCAACTGCACCCCGCCCAACAACAACACCCGCAAGTCCATCCGATCGGCCCGCGCTT  
 CTACGCCACCGCGGACATCATCGGCGACATCCGCAAGGCTACTGCAACATCAACCCGACCCCTGTGGAACGAGACCCCTGAAGAAAGGTGGCCG  
 AGGAGTTCAAGAACCACTTCAACATCACCGTACCTTCAACCCCTCCCGGGGACCTGGAGATCACACCCACTCCTTCAACTGCCG  
 GCGAGTTCTTCTACTGCAACACCTCCGACCTGTTCAACAACACCGAGTGAACAACACCATACCCCTGCCCTGCCGATCCGCCA  
 GTTCGTGAACATGTGGCAGCGCGTGGCCCGCCATGTACGCCCCCTCATCGCCGCCAGATCCAGTGCAACTCCAACATCACCGGCTGC  
 TGCTGACCCCGGACGGCGCAAGAACGGCTCCGAGAACCTCGCCCGCGCGGCGGACATGCGCGACAACTGGCGCTCCGAGCTGTACAAG  
 TACAAGGTGTGAAGATCGAGCCCTGGCGTGGCCCGCCCAAGGCCAAGCGCCAGGTGGTGCAGCGCGAGAGCGCGCTGGGCATCGG  
 CGCCGTGCTGTGGGCTTCTTGGGCGCGCGGCTCCACATGGGCGCGCTCCATCACCTGACCTGACCTGAGTGGGCAATCAAGCAGCTGCAG  
 GCATCGTGACGACGAGTCCAACCTGTGAAGGCCATCGAGGCCAGCAGCACCTGTGGGCTGTCTCGGCAAGCTGATCTGCACCCCAACGT  
 GCCCGCATCTCCTCGTCCAAACAAAGTCCAGGACAGAGATCTGGGACAACATGACCTGGATGCAGTGGGAGAGGAGATCTCCAACTACA  
 CCGACACCATCTACCGCTGATCGAGGACGCCAGAACCCAGAACCCAGGAGAGAAACGAGCAGGACCTGTGGCCCTGGACAAAGTGGACAACTG  
 TGGTCTTGGTTCAACATCAACCTGCTGAGGCTACTCCCGCTGTCCCTGCAGACCTGATCCCCAACCCCGCGGCTGGCATCGTGTTCGC  
 CGTGTGTCCGTGGTGAACCGGTGCGGAGCAGGACCGGACCGCTCCATCCGCTGGTGTCCGCTTCTGGCCCTGGCTGGGACGACCTGCGC  
 GCGGATCGAGGAGGAGGCGGCGGAGCAGGACCGGACCGCTCCATCCGCTGGTGTCCGCTTCTGGCCCTGGCTGGGACGACCTGCGC  
 TCCCTGTGCTGTCTCCTACCGCCACCTGCGCGACTTCATCTGATCGCCCGCCGACCCGTGGACATGGGCTGAAGCGCGGTGGGAGGC  
 CCTGAAGTACCTGTGGAACCTGCCCCAGTACTGGGCGCAGGAGCTGAAGAACTCCGCCATCTCCCTGCTGGACACCAACCGCATCGCCGTGG  
 CCAGGCGACCGACCGCATCATCGAGGTGCTGCAGCGCGCGCGCTGTGCACATCCCCCGCGCATCCGCCAGGGCTTCGAGCGC  
 GCCCTGCTGTAA

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Fig. 51A

**2003 CON G Env**

MRVKGIORNWOHLWKWGTLILGLVICSASNLLWTVVYGVVWEDADTTLCASDAKAYSTERHNVWATHACVPTDPNPQEITLENVTF  
 NMWKNMVEQMHEDIISLWDESLKPCVKLTPLCVTLNCTDVNTNNTNTKKEIKNCSFNITTEIRDKKKKEYALFYRLDVVPINDNGNSS  
 IYRLINCNVSTIKQACPKVTFDPIPIHYCAPAGFAILKCRDKKENGTPCKNVSTVQCTHGKIPVSTQLLLLNGSLAEEIIIRSENITDNT  
 KVIIVQLNETIEINCTRPNNTRKSIRIGPGQAFYATGDIIGDIRQAHCVSRTKNEMLOKVKAQLKKIFNKSITFNSSSGGDLEITTHSF  
 NCRGEFFYCNTSGLFNSSLNSTSTITLPCKIKQIVRMWQVQAMYPPIAGNITCRSNITGLLLTRDGGNNNTETFRPGGDMRDNRWS  
 ELYKYIKVIKPIGVAPTRARRRVEREKRAVGLGAVLLGFLGAAGSTMGAASITLTVOVQRLSGIVQQSNLLRAIEAQHLLQLTVWGI  
 KQLOARVLAVERYLKDQQLGIWGCSGKLICTTNVPWNTSWSNKSNEIWDNMTWIEWEREISNYTOQIYSLIEESQNOQEKNEQDILLALDK  
 WASLWNWFDTKWLWYIKIFIMIVGGLIGLRIVFAVLSIVNRVRQGYSPLSFQTLTHHQREPDPERIEEGGEGQDKDRSIRLVSGFLALAW  
 DDLRSLCLFSYHRLRDFILIAARTVELLGRSSLKGLRLGWGLKYLWNLLLYWGOELKNSAINLLDTIAIAVANWTDRIEVAQACRAILN  
 IPRRIRQGLERALLS

Fig. 52A

**2003 CON H Env**

TRVMEQORNPSPSLWRWGTLILGMLLICSAAAGNLWTVVYGVVWKEAKTTLCASDAKAYETEKHNWATHACVPTDPNPQEMVLENTNF  
 NMWENDMVEQMHDTIISLWDQSLKPCVKLTPLCVTLDCSNVNTTATNSRFNMQEELTNCSEFNVTTVIRDKQKQKHALFYRLDVVPIDNNNS  
 YQYRLINCNTSVITQACPKVSFEPIPIHYCAPAGFAILKCNKTFNGTGCTNVSTVQCTHGIRPVSTQLLNGSLAEEQVIRSKNISDN  
 TKNIIVQLNKPVEITCTRPNNTRKSIHLGPGQAFYATGDIIGDIRQAHCNISGKKWNKTLHQVVTQLGKYFDNRTIIFKPHSGGDMEVTH  
 SFNCRGEFFYCNTSGLFNSSWTNDTKNIITLPCRIKQIVNMWQVQAMYPPIKGNITCVSNITGLILTFDEGNNTVTFRPGGDMRD  
 NWRSELYKYKVVKIEPLGVAPTEARRRVEREKRAVGMGAFFLGLGAAGSTMGAASITLTVOARQLLSGIVQQSNLLRAIQAOQHMLQLT  
 VWGIKQLOARVLAVERYLKDQQLGIWGCSGKLICTTNVPWNSSWSNKSLEIWDNMTWMEWDKQINNYTEEYRLLLEVSTQOQEKNEQDLL  
 ALDKWASLWNWFSITNWLWYIKIFIMIVGGLIGLRIIFAVLSIVNRVRQGYSPLSFQTLIPNPRGPDREGEIEEGEGQDRDRSVRLVNGFL  
 PLVWDDLRSLCLFSYRLRLDLLIVVRTVELLGRRGREALKYLWNLLQYWGOELKNSAINLLNTTIAIAVAEGTDRIIEIVQRAWRAILHIPR  
 RIRQGFERTLLS

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Fig. 51B

2003 CON G Env. seq. opt

ATGCGCGTGAAGGGCATCAGCGCAACTGGCAGCACCTGTGGAAGTGGGCACCCCTGATCCTGGGCCCTGGTGATCATCTGCTCCGGCCTCCAA  
CAACCTGTGGGTGACCGTGTACTACGGCGTCCCGTGTGGAGGACGCCGACACCACTGTTCTGGCCCTCCGACGCCAAGCCCTACTCCA  
CCGAGCGCCACAACGTGTGGGCCACCCAGCCTGCGTGCCCAACGACCCCAACCCAGGAGATCACCCCTGGAGAACGTGACCGAGAACTTC  
AACATGTGAAGAAACAACATGTTGAGCAGATGCACGAGGACATCATCTCCCTGTGGACGAGTCCCTGAAGCCCTGCTGAAGCTGCTTCAACA  
CCTGTGCGTGACCCCTGAACGACCGAGTGAACGACCAACAACCAAGAGATCAAGAACTGCTTCTTCAACA  
TCACCAACGAGATCCGCGACAAGAAGAGAGTACGCCCTGTTCTACCGCTGGACGTGGTGCCCATCAACGACAACGGCAACTCCTTC  
ATCTACCGCCTGATCAACTGCAACGTTCCACCATCAAGCAGGCTGCCCAAGGTGACCTTCGACCCCATCCCATCACTGCTGCGCCC  
CGCGGCTTCGCCATCCTGAAGTGCCTGGGACAAAGATTCAACGGCACCGGCCCTGCAAGAACGTGTCCACCGTGCAGTGCAACCCACGGCA  
TCAAGCCCGTGGTGTCCACCGAGCTGTGTGAACGGTCCCTGGCCGAGGAGGAGATCATCATCCGCTCCGAGACATCACCGACACACACC  
AAGGTGATCATCGTGCAGTGAACGAGACCATCGAGATCAACTGCACCCGCCCAACAACAACCCGCAAGTCCATCCGATCGGCCCGCG  
CCAGGCTTCTACGCCACCGCGGACATCATCGCGGACATCCGCCAGGCCCACTGCAACGTGTCCCGACCAAGTGGAAACGAGATGCTGCAGA  
AGGTGAAGGCCAGCTGAAGAAGATCTTCAACAAGTCCATCACTTCAACTCCTCCGGGGCGACCTGGAGATCACCACTCCTTC  
AACTGCCGCGGCGAGTTCTTCTACTGCAACACCTCCGGCTGTTCACAACACTCCTGCTGAACCTCCACCACTCCACCATCACCCCTGCCCTG  
CAAGATCAAGCAGATCGTGGCATGTGGCAGCGCGTGGCCAGGCCATGTACGGCCCCCTTCCGCCCGCGGCGGACATGCGCGACAACTGGCGCTCC  
TCACCGGCTTGTGCTGACCCCGACCGCGGCAACAACAACCGAGACCTTCCGCCCGCGGCGGCGGACATGCGCGACAACTGGCGCTCC  
GAGCTGTACAAGTACAAGATCGTGAAGATCAAGCCCCCTGGCGTGGCCCAACCGAGACCTTCCGCCCGCGGCGGCGGACATGCGCGACAACTGGCGCTCC  
CGTGGGCTTGGCGCGTGTGCTGGGCTTCTGGGCGCGCGGCTCCACCATGGGCGCGCGCTCCATCACCTGACCGTGCAGGTGCGGC  
AGCTGCTGTCCGGCATCGTGACGACAGTCCAACTGCTGGCGGCTAGAGGCCAGCAGCACCTGCTGGGCTGTCCGGCTGCTCCGGCAAGTGTG  
AAGCAGTGCAGGCCCGGCTGTGGCGGCTACCTGAAGGACCAAGCATCTGGGCTGTGGGCTGCTCCGGCTGCTCCGGCTGCTGCTGCTG  
CACCAACACGTGCGCTGGAACACCTCCTGCTCCAAAGTCTTACACGAGATCTGGGACAAACATGACCTGGATCGAGTGGAGCGCGAGA  
TCTCCAACTACACCCAGCAGATCTACTCCCTGATCGAGGAGTCCCAAGAACAGCAGGAGAGAAACGAGGACCTGCTGGCCCTGGACAAG  
TGGGCTCCTGTGGAACTGGTTCGACATCACCAAGTGGCTGTGGTACATCAAGATCTTCAATCATGATCGTGGCGGCTGATCGGCTGCG  
CATCGTGTTCGCCGTGTCTCCATCGTGAACCGCGTGGCGGCTACTCCCGCTGTCTTCCAGACCTGACCCACAGCGGAGC  
CCGACCGCCCGAGCGCATCGAGGAGGGCGGCGGAGCAGGACAAGGACCGTCCATCCGCTGGTGTCCGGCTTCTTGGCCCTGG  
GACGACCTGCGCTCCCTGTGCTGTCTCTACCAACCGCTGCGGACTTCACTGATCGCGCGCCCGCACCGTGGAGCTGCTGGGCGGCTC  
CTCCCTGAAGGGCTGCGCTGGGCTGGAGGGCTGAAGTACCTGTGGAACCTGCTGCTACTGGGCGCAGGAGCTGAAGAACTCCGCCA  
TCAACTGCTGGACACCATCGCCATCGCCGTGGCCAACTGGACCGGCTGATCGAGGTGGCCCGCAGCGGCTGCCCGCCATCTCTGAAC  
ATCCCCCGCCCATCCGCCAGGGCTTGGAGCGCGCCCTGCTGTAA

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Fig. 52B

2003 CON H Env. seq. opt

ACCCGGTGATGGAGACCCGCGCAACTACCCCTCCCTGTGGCGTGGGGCACCCCTGATCCTGGGCATGCTGCTGATCTGCTCCGCCGCCGG  
CAACCTGTGGTGACCGGTGCTACCGCGTGGAGAGGAGGCAAGACCAACCTGTTCTGGCCCTCCGACGCCAAGGCCCTACGAGA  
CCGAGAAGCACAACTGTGGGCCACCCACCGCTGCGTCCCAACGACCCCAACCCAGAGATGGTGTGGAGAACGTAACCGGAACTTC  
AACAATGTGGAGAACGACATGGTGGAGAGATGCACACCGACATCATCTCCCTGTGGAGACAGTCCCTGAAGCCCTGCGTGAAGCTGACCC  
CCTGTGCGTGACCCCTGAGCTGCTCAACAGTGAACACCAACGACCCCACTCCCGCTTCAACATGACGAGGAGAGTGAACAACTGCTCCT  
TCAACGTGACCAACCGTGATCCGCGACAGAGAGGTGCACGCCCTGTTCTACCGCTTGAACATGAGTGGTGGCCATCGACGACAACTCC  
TACCAGTACCGCCTGATCAACTGCAACACCTCCGTGATCACCCAGGCTGCCCAAGGTGCTTTCGAGCCCAATCCCACTACTGCGC  
CCCCCGGCTTCGCCATCCTGAAGTGAACACAGACCTTCAACGGCACCGGCCCTGACCAACAGTGTCCACCGTGAAGTGAACAACTCC  
GCATCCGCCCGGTGTTCCACCCAGCTGCTGTGAACGGCTCCCTGGCCGAGGAGAGGTGATCATCCGCTCCAAGAACATCTCCGACAA  
ACCAAGAACATCATCGTGAAGTGAACAGCCCGTGGAGATCACTGACCCCGCCCAACAAACACCCGCAAGTCCATCCACCTGGGCC  
CGGCCAGGCCCTTCTACGCCACCGCGGACATCATCGCGGACATCCGCCAGTCCGACATCTCCGGCAAGAGTGAACAAAGACCCCTGC  
ACCAGGTGAGTACCCAGCTGGCAAGTACTTCGACAACCGCACCATCATCTTCAAGCCCACTCCGGCGGACATGGAGTGAACCAACCCAC  
TCCTTCAACTGCCCGCGGAGTCTTCTACTGCAACACCTCCGGCTGTTCAACTCCTCCTGGACCAACTCCACCAACGACACCAAGAACAT  
CATCACCCCTGCCGATCAAGCAGATCGTGAACATGTGGCAGCGCGTGGCCAGGCCATGTACGCCCCCGCCCATCAAGGGCAACATCA  
CCTGCGTGTCCAACATCACCGGCTGATCCTGACCTTCGACGAGGCAACAAACACCGTGACCTTCGCCCGCGGCGGCGGACATGCGCGAC  
AACTGGCGCTCCGAGCTGTACAAGTACAAGTGTGAAGATCGAGCCCTGGCGTGGCCCAACCGAGGCCCGCCCGCTCCATCACCCTGACCG  
CGAGAAGCGCGCGTGGCATGGCGCTTCTTCTGGCTTCTGGCGCGCGCTCCACCATGGCGCGCGCTCCATCACCCTGACCG  
TGCAGGCCCGCGAGTGTCTGCGCATCGTGACGACAGTCAACCTGTGCGCGCCATCAGGCCAGACGATGCTGGGCATCTGGGGCTGCTCCGG  
GTGTGGGCATCAAGCAGTGCAGGCCCGGTGCGTGGCGCTACCTGAAGGACGAGTGTGCTGGGCATCTGGGGCTGCTCCGG  
CAAGTGATCTGCACCAACCGTGGCTGCAACTCCTCTGGTCCAACAGTCCCTGGACGAGATCTGGGACAACTGACCTGGATGGAGT  
GGGACAAGCAGATCAACAACTACACCGAGGAGTCTACCGCTGTGGAGTGTCCAGACCCAGCAGGAGAAACGAGCAGGACCTGCTG  
GCCCTGGACAAGTGGCCCTCCTGTGGAAGTGGTCTCCATCAACCTGGTGTGGTACATCAAGATCTTATCATGATCGTGGGGCGGCT  
GATCGCCCTGCGCATCATCTTCGCCGTGTCCATCGTGAACCGGTGCGCCAGGGCTACTCCCGCTGTCTTCCAGACCTGATCCCCA  
ACCCCGCGGCCCGACCGCCCGAGGGCATCGAGGAGGAGGGCGGAGACCGGACCGCTCCGTGGCCCTGGTGAACGGCTTCTG  
CCCTGGTGTGGACGACCTGCGCTCCCTGTGCTTCTCTACCGCTGTGCGGACCTGCTGTGATCGTGGTGGCAGCCGTGGAGCT  
GCTGGCCCGCGCGGCGGAGGCCCTGAAGTACCTGTGGAACCTGCTGCAGTACTGGGGCCAGGAGTGAAGAACTCCGCCATCAACCTGC  
TGAACACCAACCGCCATCGCCGTGGCCGAGGGCACCGCATCATCGAGATCGTGCAGCGCGCTGGCGGCGCTCCTGCACATCCCCCGC  
CGCATCCGCCAGGGCTTCGAGCGCACCCCTGCTGTAA

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Fig. 53A

2003 CON 01 AE Env

MRVKETQMNWPNLWKWGTLILGLVICSASDNLWVTYYGVPVWRDADTTLFCASDAKAHETEVEHNVWATHACVPTDPNPQEIHLENVTENF  
 NMWKNMVEQMHEDVLSLWDQSLKPCVKLTPLCVTLNCTNANLTNNITNVSNIIGNITNEVRNCSFNMTTELDRKKQKVHALFYKLDIVQ  
 IEDNNSYRLINCNTSVIKQACPKISFDPIPIHYCTPAGYAILKCNDKNFNGTGPCKNVSSVQCTHGKIPVSTQLLINGSLAEEIIRSEN  
 LTNNAKTIIIVHLNKSVINCTRPSNNTRTSITIGPGQVFYRTGDIIGDIRKAYCEINGTKWNEVLKQVTEKLKEHFNNKTIIFQPPSGGDLE  
 ITMHFNCRGEFFYCNTTKLFNNTCIGNETMEGCNGTIILPCKIKQIINMWQAGQAMYPPIISGRINCVSNITGILLTRDGGANNTNETFR  
 PGGNIKDNWRSELYKYKVQIEPLGIAPTRAKRRVVEREKRAVGIGAMIFGLGAAGSTMGAASITLTVQARQLLSGIVQQSNLLRAIEA  
 QQHLLQLTVWGIKQLOARVLAVERYLKQKFLGLWGCSGKIICTTAVPWNSTWSNRSEIWNMTWIEWEREISNYTNQIYEILTESQNQQ  
 DRNEKDLLELDKWASLWNWFDITNWLWYIKIFIMIVGGLIGLRIIFAVLSIVNRVRQGYSPLSFQTPTHHQREPDPRPERIEEGGEGEQGRDRS  
 VRLVSGFLALAWDDLRLSLCLFSYHRLRDFILIAARTVELLGHSSSLKGLRRGWEGLYLGNLLLYWGQELKISALSILDATAIAVAGWTDTRI  
 EVAQGAWRAILHIPRRIRQGLERALL\$

Fig. 54A

2003 CON 02 AG Env

MRVMGIQKNYPILLWRWGMIFWIMIICNAENLWVTYYGVPVWRDAETTLFCASDAKAYDTEVHNVWATHACVPTDPNPQEIHLENVTENEN  
 MWKNMVEQMHEDVLSLWDQSLKPCVKLTPLCVTLNCTNANLTNNITNVSNIIGNITNEVRNCSFNMTTELDRKKQKVYALFYRLDVQINKNNNSQYR  
 LINCNTSAITQACPKVSFEPIPIHYCAPAGFAILKCNDKEFNCTGTPCKNVSTVQCTHGKIPVSTQLLINGSLAEEIIRSENITNNAKTII  
 IVQLVKPVKINCTRPNNTNRKSVRIGPGQTFYATGDIIGDIRQAHCVSRWKNNNTLQQVATQLRKYFNKTIIFANPSGGDLEITTHSFNCG  
 GEFFYCNTSELFNSTWNSTWNNTTEKCTITLQCRIKQIVNMWQKVQAMYPPIQGVIRCESNITGLLLTRDGGNNSTNETFRPGGDMRDNW  
 RSELYKYKVQIEPLGVAPTRAKRRVVEREKRAVGIGAVLGLGAAGSTMGAASITLTVQARQLLSGIVQQSNLLRAIEAQHLLKLTWV  
 GIKQLOARVLALERYLKDQQLGIWGCSGKLICTTVPWNSSWSNKTNDINDNMTWLQWDKEISNYTDIYNLIEESQNNQEKNEQDLLAL  
 DKWASLWNWFDITNWLWYIKIFIMIVGGLIGLRIVEAVLTIINRVRQGYSPLSFQTLTHHQREPDPRPERIEEGGEGEQDRDRSVRLVSGFLAL  
 AWDDLRLSLCLFSYHRLRDFVILIAARTVELLGHSSSLKGLRLGWEALKYLGNNLLSYWGQELKNSAINLLDTIAIAVANWTDRIEIGQAGRAI  
 LNIIPRRIRQGLERALL\$



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**Fig. 54B**

2003 CON\_02\_AG Env.seq.opt

[illegible]

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Fig. 55A

2003 CON 03 AB Env

MRVKEIRKHLWRWGTLFLGMLMICSATENLWVTYYGYVPVWKEATTLFCASDAKAYSKEVHNVMATYACVPTDPSQEIPLENVTEFNMG  
 KNNMVEQMHEDIISLWDQSLKPCVKLTPLCVTLNCTDLKKNVTSTNTSSIKMMEMKNCSENIITDLRDKVKKEYALFYKLDVQIDNDSYRL  
 ISCNTSVVTQACPKISFEPIPIHYCAPAGFAILKCNDKKFNGTGPCTNVSTVQCTHGKIPVSTQLLNGSLAEEVVIRSVNFTDNTKTII  
 VQLKEPVEINCTRPNNNTRKGHIHGPGRAFYATGDIIGDIRQAHCNISITKWNNTLKQIVIKLRKQFGNKTIVFNQSSGGDPEIVMHSFNCG  
 GEFYCNCTTKLFNSTWNGTEELNTEGDIIVTLPCRIKQIINMWQEVGKAMYAPPIAGQIRCSSNITGLLLTRDGGNQSNVTEIFRPGGDMR  
 DNWRSELYKYKVVKIEPLGVAPTAKARRVVQREKRAVGIGAVFLGAGSTMGAASTITVQARQLLSGIVQQNNLLRAIEAQQHLLQL  
 TVWGIKQLOARVLAVERYLKDQQLGIWCCSGKLICTTAVPWNTSWSNKSLDEIWNMTWMEWEREINNYTGLIYNLIEESQOQEKNEQEI  
 LALDKWASLWNWFDISKWLWYIKIFIMIVGGLVGLRIIFAVLSIVNRVQGYSPLSFQTRLPTQRPDRPEGIEEGGERDRDTSIRLVNGF  
 LALIWDRLSLCLFTYHHLRDLLLLIAARIIVELLGRRGWEALKYWWNLLQYWIQELKSSAINLIDTIAIAVAGWTDRIEIGQRECFRAIRNIP  
 RRIRQGAEKALQ\$

Fig. 56A

2003 CON 04 CPX Env

MRVMGIQRNYPHLWEWGTLILGLVICSASKNLWVTYYGYVPVWRDAETTPFCASDAKAYDKEVHNWATHACVPTDPNPQEIALKNVTEFN  
 NMWKNMVEQMHEDIISLWDEGLKPCVKLTPLCVALNCSNATINNSTKTNSTEEIKNCSENIITEIRDKKKEYALFYRLDIVPINDSANN  
 SINSEYMLINCNASTIKOACPKVTFEPIPIHYCAPAGFAILKCNDKNFTGLGCTNVSSVQCTHGKIPVSTQLLNGSLATEGVVIRSKNF  
 TDNTKNIIVQLAKAVKINCTRPNNNTRKSVHIGPGQTWYATGEIIGDIRQAHCNISGNDWNETLQKIVEELRKHFPNKTIIIFAPSAGDLEI  
 TTHSFNCGGEFFYCNTSELFNSTYMNSTNTINKTITLPCRIKQIVSMWQEVGQAMYAPPIAGSINCSSDITGIIILTRDGNNTNNETFR  
 PGGDMRDNWRSELYKYKVVKIEPVGVAPTRARRRVVQREKRAVGIGAVFLGAGSTMGAASTITVQARQLLSGIVQQNNLLRAIEA  
 QQHLLRLTVWGIKQLOARVLALESYLDQQLGIWCCSGKLICTTNVPWNSSWSNKSNDIWNMTWLQWDKEINNYTQIIYELLEESQOQ  
 EKNEQDLIALDKWANLWNWFNISNWLWYIKIFIMIVGGLIGLRIIFAVLSIVNRVQGYSPLSLQTLIPTTQRPDRPEGTEEGEGEQDRSR  
 SIRLVNGFLPLIWDRLNLCFSYRHLRNLIIIIVARTVELLGIRGWEALKYILWNLLLYWGQELRNSAINLLDTTIAIAVAEGTDRIIEAVQRA  
 CRAIRNIPRRIRQGLERALL\$



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Fig. 55B

2003 CON 03 AB Env. seq. opt

ATGCGGCTGAAGAGATCCGCAAGCACCTGTGGCGCTGGGGCAACCTGTTCCTGGGCATGCTGATGATCTGCTCCGCCACCGAGAACCTGTG  
GGTGACCCGTGTACTACGGCGTGTGGAAGAGGCCACCAACCTGTTCCTGGCCTCCGACCGCAAGGCCCTACTCCAAGGAGGTGC  
ACAACTGTGGGCCACTACGCTGCGTGCCACCGACCCCTCCCGCAGGAGATCCCGCTGGAGAACGTGACCGGAACTTCAACATGGGC  
AAGAACAACTGTGTGAGCAGATGACGAGGACATCATCTCCCTGTGGGACCACTCCCTGAGCCCTGCGTGAAGCTGACCCCTGTGCGT  
GACCTGAACCTGCACCGACCTGAAGAAGAACGTGACCTCCACCAACACTCTCCATCAAGATGATGGAGATGAAGAACTCTCTTCAACA  
TCACACCGACCTGCGCGACAAAGGTGAAGAAGGAGTACGCCCTGTTCACAAAGTGGACGTGGTGCAGATCGACAACGACTCTACCGCCTG  
ATCTCCTGCAACACCTCCGTGTGACCCAGGCTGCCCAAGATCTCCTTCGAGCCCATCCCATCTCACTACTGCGCCCGCCGCTTCGC  
CATCTGAAGTGCAACGACAAGAGTTCAACGGCACCGGCCCTGCACCAACGTGTCCACCTGCACTGACCCACGGCATCAAGCCCGTGG  
TGTCCACCCAGCTGCTGTGAACGGCTCCCTGGCCGAGGAGGTGGTGTATCCGCTCCGTGAACCTTCAACGACAACCAAGACCATCATC  
GTGAGCTGAAGGAGCCCGTGGAGATCAACTGCACCCCGCCCAACAAACACACCCGCAAGGCACTCCACATCGGCCCGCGCTTCTA  
CGCCACCGCGACATCATCGCGACATCCGCCAGGCCCACTGCAACATCTCGATCACCAAGTGAACAAACACCTGAAGCAGATCGTGATCA  
AGCTGCGCAAGCAGTTCGGCAACAAGACCATCTGTGTTCAACCAAGTCTCCGGCGGACCCCGAGATCGTGATGCACTCTTCAACTGCGGC  
GGCGAGTTCTTACTGTCAACACCAACCAAGCTGTTCACTCCACCTGGAACGGCACCGAGGAGTGAACAAACACCGAGGGCAGATCGTGAC  
CCTGCCCTGCCGATCAAGCAGATCATCAACATGTGGCAGGAGTGGGCAAGGCCATGTACGCCCGCCCATCGCGCCGAGATCCGCTGCT  
CCTCCAACATCACCGGCTGCTGTGACCCCGGACGGCGCAACCAAGTCCAACTGACCGAGATCTTCGCCCGCGCGGCGGACATGCGC  
GACAACTGGCGCTCCGAGCTGTACAAGTACAAGTGGTGAAGATCGAGCCCTTGGCGTGGCCCGCCACCAAGGCCAAGCGCGCGTGGTGCA  
GCGGAGAAGCGCGCGTGGCATCGCGCGCTTCTTGGGCTTCTTGGCGCGCGCGCTCCACCATGGCGCGCGCTCCATCACCTGA  
CCGTGCAGGCCCGCGCATCGTCCGGCATCGTGCAAGCAGACAAACCTGTGCGCGCATCGAGGCCAGCAGCACCTGTGGGCTGCTC  
ACCGTGTGGGCATCAAGCAGTGCAGGCCCGCGTGTGGCCGTGAGCGCTACCTGAAGGACCAAGCAGCTGCTGGGCTGCTGGGCTGCTC  
CGCAAGCTGATCTGCACCAACCGCGTGCCCTGGAACACCTCTGTCACCAAGTCCCTGGACGAGATCTGGAACAACATGACCTGGATGG  
AGTGGAGCGCGAGATCAACAACTACACCGCGCTGATCTACAACTGATCGAGGAGTCCAGAACCCAGCAGGAGAGAACGAGCAGGATC  
CTGGCCCTGGACAAAGTGGCCCTCCCTGTGGAACCTGGTTCGACATCTCCAAGTGGCTGTGGTACATCAAGATCTTCAATGATCGTGGCGG  
CCTGGTGGCCCTGCGCATCATCTTCGCCGTGCTGTCAACCGCGTGGCGGAGCGGCGGAGCGGACCCGACACCTCCATCCGCCCTGGTGAACGGCTTC  
CCACCCAGCGCGGCCCGACCGCCCGAGGCGCATCGAGGAGGCGGCGGAGCGGACCCGACACCTCCATCCGCCCTGGTGAACGGCTTC  
CTGGCCCTGATCTGGGACGACCTGCGCTCCCTGTGCTGTTTCACTACCAACCACTGCGCGACCTGTGTGATCGCGCCCGCATCGTGGA  
GCTGTGGCGCGCGCGCTGGGAGGCCCTGAAGTACTGTGGAACCTGTGCACTGGAATCCAGGAGTGAAGTCTCCGCCCATCAAC  
TGATCGACACCATCGCCATCGCCGTGGCGGCTGGACCGCGGCTGATCGAGATCGGCCAGCGCTTCTGCCGCGCATCCGCAACATCCCC  
CGCCGATCCGCCAGGCGCGGAGAGGCCCTGCAGTAA

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Fig. 56B

2003 CON 04 CPX Env. seq. opt

ATGCGCGTATGGGCATCCAGCGCAACTACCCCACTGTGGAGTGGGGCACCCCTGATCCTTGGGCTGGTGATCATCTGCTCCGCTCCAA  
GAACCTGTGGTGACCGTGTACTACGGCGTGGCGGACGCGAGACCAACCCCTTCTGGCCCTCCGACGCAAGGCTACGACA  
AGGAGGTGCACAACATCTGGGCCACCCACGCTGGGTGCCACCGACCCCAACCCAGAGATCGCCCTGAAGAACGTGACCGAAGCTTC  
AACATGTGAAGAACAACATGTGGAGCAGATGCACGAGACATCATCTCCCTGTGGACGAGGCTGAAGCCCTGCTGAAGCTGACCCC  
CCTGTGCGTGGCCCTGAACCTGCTCAACGCCACCATCAACAACTCCACCAAGACCAACTCCACCGAGGAGATCAAGAACTGCTCCTTCAACA  
TCACACCGAGATCCGCGACAAGAAGAGGAGTACGCCCTGTCTACCGCTGGACATCTGCCCCATCAACGACTCCGCCAACAAAC  
TCCATCAACTCCGAGTACATGCTGATCAACTGCAACGCCCTCCACCATCAAGCAGGCTGCCCAAGTGACCTTCGAGCCCATCCCCATCCA  
CTACTGGCCCCCGCGGCTTCGCCATCTCTGAAGTGAACGACAAAGAACTTCACCGGCTGGGCCCCCTGCACCAAGTGTCTCCGTGCAGT  
GCACCAACGCGCATCAAGCCCGTGTCCACCCAGCTGCTGTAACGGCTCCCTGGCCACCGAGGGCGTGTATCCGCTCCAAGAACTTC  
ACCGACAACACCAAGAACATCATCTGAGCTGGCCAAAGCCGTGAAGATCAACTGCACCCGCCCAACAAACACCGCAAGTCCGTGCA  
CATCGCCCCCGCCAGACCTGGTACGCCACCGCGAGATCATCGCGGACATCCGCCAGGCCCACTGCAACATCTCCGGCAACGACTGGAACG  
AGACCTGCAGAAATCGTGGAGGAGCTGCGCAAGCACTTCCCAACAAGACCATCATCTTCGCCCCCTCCGCCGGCGGACCTGGAGATC  
ACCACCACTCCTTCAACTGCGGCGGAGTCTTCTACTGCAACACCTCCGAGCTGTTCAACTCCACCTACATGAATCCACCAACTCCAC  
CACCATCAACAAAGACCATCAACCTGCCCTGCCGATCAAGCAGATCGTGTCCATGTGGAGGAGTGGGCCAGGCCATGTACGCCCCCCCA  
TCGCCGGCTCCATCAACTGCTCCGACATCACCGCATCATCTGACCCCGCAAGTACAAGTGAAGTGAAGTGAAGTGAAGTGAAGTGAAGT  
CCCGGGCGCGGACATCGCGACAACCTGGCGCTCCGAGCTGTACAAGTACAAGTGAAGTGAAGTGAAGTGAAGTGAAGTGAAGTGAAGT  
CGCCCGCGCGGTGGTGCAGCGGAGAGCGCGCGTGGCATCGCGCGCTGTTCTGGGCTTCTGGGCGCGCGCGCTCCACCATGG  
GCGCGCTCCATCACCTGACCGTGCAGCGCGCGCGCGCTGTCCGGCATCTGTGACGAGTCCAACTGCTGCGCGCGCATCGAGGCC  
CAGCAGCACTGCTGCGCTGACCGTGTGGGCGATCAAGCAGTGCAGGCCCGCGCTGGCCCTGGAGTCCCTACCAAGTCCACAGCATCT  
GCTGGCATCTGGGCTGCTCCGGCAAGTGTCTGCACCAACCACTGGAACCTCCCTGGTCCAAAGTCCACAGGAGTCCCAAGAACGACATCT  
GGACACATGACCTGGTGCAGTGGACAAAGGAGTCAACAACTACACCCAGATCATCTACGAGCTGTGGAGGAGTCCCAAGAACGACAG  
GAGAAGAACGAGCAGGACCTGCTGGCCCTGGACAAGTGGCCAACTGTGGAACCTGGTCAACATCTCAACTGGTGTGGTACATCAAGAT  
CTTCATCATGATCGTGGCGGCTGATCGGCTGCGCATCATCTTCGCCGTGTGTCCATCGTGAACCGCGTGGCGGAGTCCCGGCTCCCGC  
TGTCCTGCAGACCTGATCCCCACCAACCGCGGCCCCGACCGCCGAGGGCACCGAGGAGGAGGCGGCGAGGACCGCTCCCGC  
TCCATCCGCTGTGAACGGCTTCCTGCCCTGTGATCTGGGACGACCTGGCAACCTGTGCTGTCTCTCTACCGCCACCTGCGCAACCTGCT  
GCTGATCGTGGCCCGCACCGTGGAGTGTGGGATCCCGGCTGGGAGGCCCTGAAGTACCTGTGGAACCTGTGCTGTACTGGGGCCAGG  
AGCTGCGCAACTCCGCCATCAACCTGTGGAACACCGCCATCGCGTGGCGGAGGACCGGACCGCATCATCGAGGCCGTGAGCGCGC  
TGCCGCGCCATCCGCAACATCCCCCGCGCATCCGCCAGGGCTGGAGCGCGCTGCTGTAA

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Fig. 57A

2003 CON 06 CPX Env

MRVKGIQKŃQHLWKWGTLILGLVICSASNNMWVTYYGVPAWEDADTILFCASDAKAYSAEKHNWATHACVPTDPNPQEI ALENVTENF  
 NMWKNHMVEQMHEDIISLWDESLKPCVKLTPLCVTLNCTNVTKNNTKIMGREEIKNCSEFNVTEIRDKKKKEYALFYRLDVVPIDDDNNNSY  
 RLINCNASTIKQACPKVSFEPIPIHYCAPAGFAILKCRDKNFNGTGPCKNVSTVQCTHGKIPVSTQLLNGSLAEEIIKSENLTDTNKT  
 IIVQINKSVEIRCTRPNNTRKSISEFGQAFAFYATGDIIGDIRQAHCVSRTDWNMLQNVTAKLKELENKNITFNSSAGGDLEITTHSFNC  
 GGEFFYCNTSOLFENSTRPNETNTITLPCIKQIVRMWQVGOAMYPPIAGNITCTSNITGLLTRDGNNDSETFRPGGDMRDNRSELY  
 KYKVVKIKPLGIAPTRRRRVGREKRAVGLGAVELGFLGTAGSTMGAASITLTVOVRQLLSGIVQQSNLLRAIEAQHLLQLTVWGIKQL  
 QARVLAVERYLKDQQLGIWGCCKLICPTNVPWNASWSNKTYNEIWDNMTWIEWDREINNYTQQIYSLIEESQNOQEKNEQDLLALDKWAS  
 LWSWFDISNWLWYIKIFIMIVGGLIGLRIVFAVLSIVNRVRQGYSPLSLQTLIPNPTGADRPGEIEEGGEGQGRTRSIRLVNGFLALAWDDL  
 RSLCLFSYHRLRDFVLIAARTVETLGHGWEILKYLGNLVCYWGQELKNSAISLLDTTAIAVANWTDRIEVVQVRFRAFLNIPRRIRQGFE  
 RALL\$

Fig. 58A

2003 CON 08 BC Env

MRVRGTRRNYQŃWILWGLGFWMLMICNVEGNLWVTYYGVVPWKEAKTTLFCASDAKAYETEVHNVWATHACVPTDPNPQEI VMENVTENF  
 NMWNNDMVNQMHEDVISLWDQSLKPCVKLTPLCVTLECTNVSSNGNGTYNETYNESVKEIKNCSEFNATTLRDRKKTYYALFYRLDIVPLND  
 ENSGKNSSYYRLINCNTSAITQACPKVTFDPIPIHYCTPAGYAILKCNDDKFNFGTGQCHNVSTVQCTHGKIPVSTQLLNGSLAEREII  
 RSENLTNNVKTIIVHLNQSVETCTRPNNTRKSIIRIGPGQTFYATGDIIGDIRQAHCVSRTDWNMLQNVTAKLKELENKNITFNSSAGGDLEITTHSFNC  
 GDLEITTHSFNCRGEFFCYNTSGLFNGTYMNGTNNSSIIITPCRIKQIINMWQEVGRAMYAPPIEGNITCKSNITGLLLVRDGGRTESNNT  
 EIFRPGGDMRNNWRNELYKYKVEIKPLGVAPTAARRVVEREKRAVGLGAVELGFLGAGSTMGAASITLTVOARQLLSGIVQQSNLLR  
 AIEAQHMLQLTVWGIKQLQTRVLAIERYLKDQQLGIWGCCKLICTTAVPNWSSWSNKSQOEIWDNMTWQWDKEISNYTNTIYRLLEDS  
 QNQQRNEKDLLALDSWKNLWSFEDITNWLWYIKIFIMIVGGLIGLRIFAVLSIVNRVRQGYSPLSFOILTPNPGGPRGLGRIEEEGEQD  
 KTRSIRLVNGFLALAWDDLRNLCLFSYHRLRDFILLTARGVELLGRNSLRGLQRGWEALKYGLSVQYWGLELKKSTISLVDTIAIAVAEGT  
 DRIINIVQICRAIHNIIPRRIRQGEAALQ\$

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Fig. 57B

2003 CON 06 CPX Env. seq. opt  
,ATGCGCGTGAAGGCATCCAGAGAAGAACTGGCAGCACCTGTGAAGTGGGCACCCCTGATCCTGGGCTGGTGATCATCTGCTCCGCTCCAA  
CAACATGTGGTGACCGTGTACTACGGCGTGGGAGGACGCCGACACCATCTGTCTGCGCTCCGACGCCAAGGCTACTCCG  
CCGAGAAACAACAGTGTGGCCACCCACCGGAGATCGCCCTGGAGAACGTGACCGGAACTTC  
AACATGTGAAGAACAACATGTGTGAGCAGATGACGAGGACATCATCTCCCTGTGGACGAGTCCCTGAAGCCCTGCTGAAGCTGACCCC  
CCTGTGCGTGAACCTGAACGACCAACGAGTGAACCAACCAAGATCATGGGCGCGGAGGATCAAGAACTGCTCTTCAACG  
TGACCAAGGATCCGCGACAAGAAGAGTACGCCCTGTCTACCGCTGGACGTGGTGGCCCATCGACGACAACAACACTCCTAC  
CGCTGATCAACTGCAACGCTCCACCATCAAGCAGGCTGCCCAAGGTGTCTTTCGAGCCCATCCCATTCACCTAGTGGCCCCCGCGG  
CTTCGCCATCCTGAAGTCCCGGACAAAGAACTTCAACGGCACCGGCCCTGCAAGAACGTGTCCACCGTGAGTGCACCCACGGCATCAAGC  
CCGTGGTGTCCACCCAGCTGTCTGAACGGCTCCCTGGCCGAGGAGGATCATCATCAAGTCCGAGAACCTGACCCGACAACCAAGACC  
ATCATCGTGCAGTGAACAAGTCCGTGGAGATCCGCTGCACCCGCCCAACAACAACCCGCAAGTCCATCTCTTGGCCCCCGGCGAGGC  
CTTCTACGCCACCGCGACATCATCGCGACATCCGCCAGGCCACTGCAACGTGTCCCGACCGACTGGAACAACATGCTGCAGAACGTGA  
CCGCCAAGCTGAAGGAGCTGTTCAACAAGAACATCACTTCAACTCTCCCGCGCGGACCTGGAGATCAACCCACTCTCTTCAACTGC  
GGCGCGAGTCTTCTACTGCAACACTCCAGCTGTCAACTCAACCGCCCCACGAGACCAACCATCACTGACCTGCCCTGCAAGATCAA  
GCAGATCGTGGCATGTGGCAGCGGTGGCCAGGCCATGTACGCCCCCCCATCGCGGCAACATCACTGACCTTCCAAACATCACCGGCC  
TGCTGTGACCCGCGACGCAACAACGACTCCGAGACCTTCCGCCCGCGGCGGACATGCGCGACAACCTGCGCTCCGAGCTGTAC  
AAGTACAAGTGTGAAGATCAAGCCCCCTGGGCATCGCCCCCAACCGCGCGCGCGCTGTGGTGGCGCGGAGAACGCGCGTGGCCT  
GGCGCGGTGTTCTTGGGCTTCTGGGCACCGCGGCTCCACCATGGCGCGCGCTCCATCACCTGACCTGACCGTGCAGGTGCGCGAGCTGTGT  
CCGGCATCGTGACGACGAGTCCAACTGCTGGCGGCCATCGAGGCCAGCAGCACCTGTGACGTGACCGTGGGCGATCAAGCAGCTG  
CAGGCCCGCTGGCGGTGGAGCGTACCTGAAGGACAGCAGCTGTGGGCTGTCTCGGCAAGCTGATCTGCCCCACCAA  
CGTGCCCTGGAAACGCTCTCTGGTCCAACAAGACCTACAAGAGATCTGGGACAACATGACCTGGATCGAGTGGACCGCGAGATCAACAAC  
ACACCCAGCAGATCTACTCCCTGATCGAGGAGTCCACAGAACCCAGCAGGAGAAAGAACGAGGACCTGTGGCCCTGGACAAGTGGGCTCC  
CTGTGGTCTCTGGTTCGACATCTCCAAGTGGTGTGATCAAGATCTTCAATGATCGTGGCGGCTGATCGGCTGCGCATCGTGT  
CGCCGTGTTCATCGTGAACCGGTGCGCAGGGCTACTCCCCCTGTCCCTGCAGACCTGTATCCCCAACCCACCGGCGCGACCGCC  
CCGGCAGATCGAGGAGGGCGGCGAGCAGGGCCGACCCGCTCCATCGCTGGTGAACGGCTTCTTGGCCCTGGCTGGGACGACCTG  
CGCTCCCTGTGCTGTCTCTACCAACCGCTGCGGACTTCGTGTGATCGCCCGCCGACCCGTGGAGACCCCTGGGCTGGGAGTGGGA  
GATCCTGAAGTACCTGGGCAACCTGGTGTGCTACTGGGCGCAGGAGTGAAGAACTCCGCCATCTCCCTGTGGACACCAACCGCATCGCG  
TGGCCAACCTGGACCGACCGCTGATCGAGGTGGTGCAGCGCGTGTCTCGCGCTTCTCTGAACATCCCCCGCGCATCCGCCAGGGCTTCGAG  
CGCGCCCTGCTGTAA

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Fig. 58B

2003 CON 08 BC Env seq. opt

ATGCGGTGCGGCACCCGCGCAACTACAGCAGTGGTGGATCTGGGGCGTGTGGCTTCTGGATGCTGATGATCTGCAACGTTGAGGG  
 CAACCTGTGGGTACCGGTGCTACTACGGGTGCTGGAAGAGGCCAAGACACCCCTGTTCTGCGCTTCCGACGCCAAGGCCCTACGAGA  
 CCGAGGTGCACAACGTTGGGCCACCCACGCTGCTGCCACCGACCCCAACCCAGGAGATCGTGTGATGGAGAACGTAACCGAGAACTTC  
 AACATGTGGAACAACGACATGTTGAACGAGATGACGAGGACGTGATCTCCCTGTGGGACCAAGTCCCTGAAGCCCTCGGTGAAGCTGACCCC  
 CCTGTGCGTGACCCCTGGAGTGCACAACGTTCCCTCAACGGCAACGGCACCTACACGAGACCTACACGAGTCCGTGAAGGAGATCAAGA  
 ACTGCTCTTCAACGCCACCCCTGCTGCGGACCGCAAGAACCCGTGTACGCCCTGTCTACGCCCTGGACATCGTGCCCTGAACGAC  
 GAGAACTCCGGCAAGAACTCTCCGAGTACTACCGCTGATCAACTGCAACACCTCCGCCATCACCAAGCTGCCCAAGGTGACCTTCGA  
 CCCATCCCATCCACTACTGCAACCCCGCGGTACGCCATCTGAAAGTGCAACGACAAAGTTCAACGGCACCGGCCAGTGCCACAACG  
 TGTCCACCGTGCAGTGCAACCAACGACGATCAAGCCCGTGGTGTCCACCCAGCTGCTGAACGGCTCCCTGGCCGAGCGGAGATCATC  
 CGCTCCGAGAACCTGACCAACAACGTGAAGACCATCATGTCACCTGAACAGTCCGTGGAGATCGTGTGCACCCGCCCAACAAACAC  
 CCGCAAGTCCATCCGATCGGCCCGCGGAGACCTTACGCCACCGCGGACATCATCGCGGACATCCGCCAGGCCCACTGCAACATCTCCA  
 AGGACAAGTGGTACGAGACCTGACGCGGTGTCCAAGAAAGTGGCCGAGCACTTCCCAACAAGACCATCAAGTTCGCTCCTCCGCGC  
 GCGACCTGGAGATCACCAACCTCCTTCAACTGCGCGGCGAGTTCTTCTACTGCAACACCTCCGGCTGTTCACGCGCACCTACATGAA  
 CGCACCAACAACCTCCTCCATCATCACCATCCCTGCCGATCAAGCAGATCATCAACATGTGGCAGGAGTGGCGCGCCATGTACG  
 CCCCCCATCGAGGGCAACATCACCTGCAAGTCCAACATCACCGGCTGCTGTGTCGCGACGGCGGCCGACCGAGTCCCAACAACACC  
 GAGATCTTCGCCCCGCGGCGGACATCGCAACAACCTGGCGCAACGAGCTGTACAAGTACAAGTGGTGGAGATCAAGCCCTGGGCGT  
 GSCCCCAACCGCGCAAGCGCGCGTGGTGGAGCGGAGAACGCGCGCTGGGCGCTGGGCGCTGTTCCTGGGCTTCTGGGCGCGCGCG  
 GCTCCACCATGGGCGCGCTCCATCACCTGACCGTGCAGGCGCGCGAGCTGTCCGGCATCGTGCAGCAGCAGTCCAACCTGCTGGCG  
 GCCATCGAGGCGCAGCACATGCTGCAGTGAACCTGACCGTGTGGGCGATCAAGCAGTGCAGACCCCGCTGGGCTCGAGCGTACCTGAA  
 GGACAGCAGCTGCTGGGCTGCTCCGGCAAGTGTGACACCAACCGCGTCCCTGGAACCTCCTCTCTGGTCCAACAAGTCCC  
 AGCAGGAGATCTGGACAACATGACCTGGATGCAGTGGGACAAGGAGATCTCCAATAACCAACCATCTACCGCTGCTGGAGGACTCC  
 CAGAACAGCAGGAGCGCAACGAGAAGGACCTGCTGGCCCTGGACTCCTTGGAGAACCTGTGGTCCCTGGTTCGACATCACCAACTGGCTGTG  
 GTACATCAAGATCTTATCATGATCGTGGGCGGCTGATCGGCTGCGCATCATCTTCCCGCTGTGTCCATCGTGAACCGCTGCGCAGG  
 GCTACTCCCCCTGTCTTCCAGATCCTGACCCCAACCCCGCGGCGCTGGCGCGCATCGAGGAGGAGGCGGCGGAGCAGGAC  
 AAGACCCGCTCCATCCGCTGGTGAACGGCTTCTGGCCCTGGCTGGGACGACCTGCGCAACCTGTGCTGTCTCTACCCGCTGCG  
 CGACTTCATCTGTCACCGCGCGGTGGAGTGTGGCGCGAACTCCCTGCGCGGCTGCAAGCGGCTGGGAGGCGCTGAAGTACC  
 TGGGCTCCCTGGTGCAGTACTGGGCGCTGGAGCTGAAGAAAGTCCACCATCTCCCTGGTGGACACCATCGCCATCGCCGTGGCCGAGGCGACC  
 GACCGCATCATCAACATCGTGCAGGCGCATCTGCGCGGCGCATCCCAACAACATCCCCCGCGCATCCGCCAGGCTTCGAGGCGCGCTGCACTA

A

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Fig. 59A

2003 CON 10 CD Env

MRVMGIQRNCQWIIWILGFWMLMICNATGNLWTVVYGVVPWKETTTLFCASDAKAYKAEAHNIWATHACVPTDPNPQEIVLENTENF  
 NMWKNMGVDQMHEDIISLWDQGLKPCVKLTPLCVTLNCDVNATNSATNTVAGMKNCSFNITTEIRDKKKQYALFYKLDVVOIDGSNTSY  
 RLINCNTSAITQACPKVTFEPIPIHYCAPAGFAILKCNDDKFNCTGCPCKNVSTVQCTHGIKPVVSTQLLNGSLAEEIIIRSENLTDNAKT  
 IIVQLNESVTINCTRPNNNTRKSIIRIGPGQTFYATGDIIGNIROAYCNIISGTWNKTLOQVAKKLGDLNKTIIIFKPSSGGDPEITHTFN  
 CGGEFFYCNTSKLENSSWTSNNTGNTSTITLPCRKQIINMWQGVGKAIYAPPIAGLINCSSNITGLLLTRDGGANNSETFRPGGGMRDNW  
 RSELYKYKVVKIEPLGLAPTAKARRVVEREKRAIGLGAFLGFLGAAGSTMGAASLTLTVOARQLLSGIVQQNNLLRAIEAQOHLLOLTWV  
 GIKQOARVLAVESYKLDQQLGIWGCSSGKHICTNVPWNSSWSNKSLEEIWDNMTWMEWEREIDNYTGLIYSLIEESQOQEKNEQELLQL  
 DKWASLWNWESITNWLWYIKIFIMIVGGLIGLRIVFAVLSLVNRVROGYSPLSFQTLPPAPRGPDPRPEGIEEGGEGQGRSIRLVNGFSAL  
 IWDDLRLNCLFSYHRLRDLILIAIRIVELLGRRGWEAIIKYLWNLLQYWIQELKNSAISLLDTTATAIAVAEGTDRAIEIVQRAVAVLNIPTRI  
 RQGLERALL\$

Fig. 60A

2003 CON 11 CPX Env

MRVKETQRNWHNLWRWGLMIFGMLMICNATENLWTVVYGVVPWKDADTTLFCASDAKAYSTEKHNVWATHACVPTDPNPQEIVLENTENF  
 NMWKNMVEQMHEDIISLWDESLKPCVKLTPLCVTLNCTDVKNATNTTVEAAEIKNCSFNITTEIKDKKKKEYALFYKLDVVPINDNNNSIY  
 RLINCNVSTVKQACPKVTFEPIPIHYCAPAGFAILKCNDDKFNCTGCPCKNVSTVQCTHGIKPVVSTQLLNGSLAEGEVRIIRSENFTNNAKT  
 IIVQLNSSVRINCTRPNNNTRKSIIRIGPGQAFYATGDIIGDIRQAHCNISRAEWNNTLOQVAKQLRENFNKTIIFNPNSSGGDLEITTHSFNC  
 GGEFFYCNTSRLFNSTWNNDTRNDTKQMHITLPCRKQIIVNMWQRVGOAMVAPPIQKIRCNSTGLLLTRDGGNNNTNETFRPTGGDMRD  
 NWRSELYKYKVEIKPLGVAPTRAKRRVVEREKRAVGIGAVLLGFLGAAGSTMGAASITLTVOARQLLSGIVQQNNLLKAEAQOHLKLT  
 VWGIKQOARVLAVERYLKDQQLGIWGCSSGKLICTTNVPWNFSWSNKSDEIWDNMTWIEWEREINNYTQTIYTLLEESQOQEKNEQDLL  
 ALDKWASLWNWFEDISNLWYIKIFIMIVGGLIGLRIIFAVLSIVNRCRQGYSPLSFQTLTPNHKEADRPGGIEEGGEGQDRTRSIRLVSGFL  
 ALAWDDLRNLCFSYHRLRDFILIAARIVETLGRRGWEILKYLGNLAQYWGQELKNSAISLLNATAIAVAEGTDRIIEVVHVRVLRAILHIPR  
 RIRQGFERALL\$

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Fig. 59B

2003 CON 10 CD Env. seq. opt

ATGGCGGTGATGGGCATCCAGCGCAACTGCCAGAGTGGTGGATCTGGGGCATCTGGGCTTCTGGATGCTGATGATCTGCAACGCCACCGG  
CAACTGTGGGTGACCGTGTACTAGGCGTGCCTGTGGAGGAGACCAACCAACCTGTTCTGCGCCTCCAGGCCAAGGCTACAAGG  
CCGAGGCCACAACATCTGGGCCACCCACGCTGCGTGCACCCAGACCCCAAGGAGATCGTGTGGAGAACGTGACCGGAACTTC  
AACATGTGGAAGAACGGCATGTTGACACAGATGCACGAGGACATCATCTCCCTGTGGACAGGCTGAGCCCTGCGTGAAGCTGACCCC  
CCTGTGCGTGAACCTGAACCTGCCAGTGAACGCCACCAACTCGGCCACCAACACCGTGTGGCGGCATGAGAACTGCTCTTCAACA  
TCACCAACGAGATCCGCGACAAGAAGCAGGAGTACGCCCTGTTCTACAAGCTGGACGTGGTGCAGATCGACGGCTCCAACACCTCTAC  
CGCTGATCAACTGCAACACCTCCGCCATCACCCAGGCTGCCCAAGTGACCTTCGAGCCCATCCCCATCCACTACTGCGCCCCCGCGG  
CTTCGCCATCCTGAAGTCAACGACACGAAGAAGTTCAACGGCACCGGCCCTGCAAGAACGTGTCCAAGTGCAGTGCACCCACGGCATCAAGC  
CCGTGTTCCACCCAGTGTGTAACGGCTCCCTGGCCGAGGAGGAGATCATCATCGCTCCGAGAACCTTGACCGACAAACGCCAAGACC  
ATCATCGTGCAGTGAACGATCCGTGACCATCAACTGCAACCCGCCCAACAACAACATCTCCGGACCGAGTGAACAAGACCTCGGCCCCGCGAGC  
CTTCTACGCCACCGGACATCATCGGCAACATCCGCCAGGCTACTGCAACATCTCCGGACCGAGTGAACAAGACCTCGCAGCAGGTGG  
CCAGAAGCTGGCGACCTGTGAACAAGACCATCATCTTCAAGCCCTCTCCGGCGGACCCCGAGATCACACCCACACCTTCAAC  
TGGCGGGCGAGTCTTCTACTGCAACACCTCCAAGCTGTTCAACTCTCTGGACCTCCAACAACACCGGCAACACCTCCACCATCACCT  
GCCCTGCCGCATCAAGCAGATCATCAACATGTGGCAGGGCTGGGCAAGGCCATCTACGCCCCCCCATCGCGCGGCTGATCAACTGCTCCT  
CCAACATCACCGCCTGCTGTGACCCGACGGCGGCCCAACAACCTCCGAGACCTTCCGCCCCCGCGGCGGCGACATCGCGCAACTGG  
CGTCCGAGCTGTACAAGTACAAGGTGGTGAAGATCGAGCCCTTGGCCCTGACCAAGGCCAAGCGCGCTGCTGGTGAAGCGCGAGAA  
GGCGCCATCGGCTGGCGCCGTGTTCTGGGCTTCTGGCGCGCGGCTCCAGCTCCACATGGCGCGCCCTCCCTGACCTGACCCCTGACCGTGCAGG  
CCGCCAGCTGTGTCGGCATCGTGCAGCAGCAGAACACCTGTCGCGGCCATCGAGGCCCAGCAGCACTGCTGCAGCTGACCCGTGTGG  
GGCATCAAGCAGTGCAGGCCCGCGTGTGCTGGCCGTGGAGTCTTACTGAAGCACAGCAGCTGTGGCATCTGGGCTGCTCCGGCAAGCA  
CATCTGACCAACCGTGCCTGGAACCTCTCCTGTTCCAAAGTCCCTGGAGGAGTCCAGAACCCAGCAGGAGAACAGCAGGAGTGGAGC  
GCGAGATCGACAACACACCGGCTGATCTACTCCTGATCGAGGAGTCCAGAACCCAGCAGGAGAACAGCAGCAGGAGTGTGCGAGCTG  
GACAAGTGGCCTCCCTGTGGAACCTGTTCTCCATCACCACCTGGCTGTGGTACATCAAGATCTTCAATCATGATCGTGGCGGCTGATCGG  
CCTGCGCATCGTGTTCGCGTGTTCCTGGTGAACCGGTGCGCCAGGGTACTCCCCCTGTCTTCCAGACCTGCTGCGCGGCTGATCGG  
GCGCCCCGACCGCCCGAGGGCATCGAGGAGGAGGCGGAGGCGCGGCTCCATCGGCTGGTGAACGGCTTCTCCGCCCCG  
ATCTGGGACGACCTGCGCAACCTGTCCCTACCAACCGCTGCGGACCTGATCCTGATCGCCACCGCATCGTGGAGCTGTGG  
CCGCCGCGCTGGAGGCCATCAAGTACCTGTGGAACCTGTGCACTGATCCAGAGCTGAAGAACTCCGCCATCTCCCTGTGGACA  
CCACCGCCATCGCGCTGGCCGAGGCCACCGACCGGCCATCGAGATCGTGCAGCGCGCTGCGCGCTGTGAACATCCCCACCGCATC  
CGCCAGGGCTGGAGCGCGCCCTGCTGTAA

**Fig. 60B**

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ATGGCGGTGAAGGAGACCCAGCGCAACCTGTGGCGCTGGGCGTGATGATCTTGGCATGCTGATCTGCAAGCCACCGA  
GAACCTGTGGTGACCGGTACTACGGCGTGCCCGTGGAAGGACGCCACACCCCTGTTCTTGGCCCTCGACGCCAAGGCTACTCCA  
CCGAGAAGACAACGTTGGGCCACCCACGCTGCGTGCCACCGACCCCAACCCCGAGGATCCCCCTGGAGAACGTGACCGAGAACTTC  
AACATGTGGAAGAACAAACATGGTGGAGCAGATGCACGAGGACATCATCTCCCTGTGGACGAGTCCCTGGAAGCCCTGCGTGAAGCTGACCCC  
CCTGTGCGTGACCTGAACCTGCACCGACGTGAAGAACGCCACCAACACCCGTTGGAGGCCCGCGAGATCAAGAACTGCTCTTCAACATCA  
CCACCGAGATCAAGGACACAAGAAAGAGGAGTACGCCCTGTTCTACAAGCTGGACGTGTGTCCTTCAACGACAAACAACACTGCTCTTCAACATCA  
CGCCTGATCAACTGAACTGCAAGTGTCCACCGTGAAGCAGGCCCTGCCCAAGGTGACCTTCGAGCCCATCCCCATCCACTACTGCGGCCCGCGCGG  
CTTCGCCATCCTGAAGTGCAACGACAGAAGTTCAACGGCACCGGCCCTGCAAGAACGTGTCCACCGTGCAGTGCACCCACCGGCATCAAGC  
CCGTGGTGTCCACCCAGCTGCTGTGAACGGCTCCCTGGCCGAGGGCGAGGTGCGCATCCGCTCCGAGAACTTCACCAACAACGCCAAGACC  
ATCATCTGTGACGTGAACCTCCTCCGTGCGCATCAACTGCACCCGCCCAACAACAACCCGCAAGTCCATCCACATCGGCCCGCGCCAGACC  
CTTCTAGCCCAACCGCGACATCATCGCGACATCCGCCAGGCCCACTGCAACATCTCCCGGCCGAGTGGAAACAACACCTCGAGCAGGTG  
CCAAGCAGCTGCGCGAGAACTTCAACAAGACCATCATCTTCAACAACCCCTCCGGCGGCACTGGAGATCACCAACACTCCTTCAACTGC  
GGCGGCGAGTTCTTCTACTGCAACACCTCCCGCTGTTCAACTCCACCTGGAACAACGACACCCGCAACGAGATCGACATCAC  
CCTGCCCTCGCCGATCAAGCAGATCGTGAACATGTGGCAGCGCTGGGCCAGGCCATGTACGCCCCCCCATCCAGGGCAAGATCCGCTGCA  
ACTCCAACATCACCGGCTGCTGTGACCCGACCGCGCAACAACAAGTGTGAGATCAAGCCCTGGCGTGGCCCCAACCCGCGCAAGCGCGCTGGAGCG  
AACTGGCGCTCCGAGCTGTAAAGTACAAGTACAAGTGTGAGATCAAGCCCTGGCGTGGCCCCAACCCGCGCAAGCGCGCTGGTGGAGCG  
CGAGAAGCGCGCGCTGGGCATCGCGCCGTGCTGGGCTTCTTGGCGCCCGCGCGCTCCACATGGCGCGCGCTCCATCACCTGACCTGACCG  
TGCAAGCCCGCCAGTGTGTCCGGCATCGTGACGACAGTCCAACCTGTGAAGCCATCGAGGCCCAGCAGCCTGCTGAAGCTGACCTGACCT  
GTGTGGGGCATCAAGCAGCTGCAGGCCCGCGTGTGCCGTGGAGCGCTACCTGAAGGACCAGCAGCTGTGGGCATCTGGGGCTGCTCCCGG  
CAAGCTGATCTGCACCAACCGTGGAACTTCTCCTGGTCCAACAAGTCTACGACGAGATCTGGACAACATGACCTGGATCGAGT  
GGGAGCGCGAGATCAACAACATACACCAGACCATCTACACCTGCTGGAGGAGTCCCAGAACCAGCAGGAGAGAAACGAGCAGGACCTGCTG  
GCCCTGGACAAGTGGGCCTCCCTGTGGAACTGGTTCGACATCTCAACTGGCTGTGGTACATCAAGATCTTCATCATGATCGTGGCGGCCCT  
GATCGGCCTGCGCATCATCTTGGCGTGTGTCCATCGTGAACCGCTGCCGCCAGGGCTACTCCCCCTGTCTTCCAGACCTGACCCCCA  
ACCACAAGGAGGCCAGCCGCCCGGGCGCATCGAGGAGGGCGGGCGGAGCAGGACCGCACCCGCTCCATCCGCTGGTGTCCGGCTTCTGT  
GCCCTGGCTGGGACGACCTGCGCAACCTGTGCCCTGTCTCCTACCAACCGCTGCGCGACTTCATCCTGATCGCCGCCCGCATCGTGGAGAC  
CCTGGGCCCGCGGCTGGGAGATCCTGAAGTACCTGGGCAACCTGGCCAGTACTGGGGCCAGGAGCTGAAGAACTCCGCCATCTCCCTGC  
TGAACGCCACCGCCATCGCCGTGGCCGAGGGCACCGCATCATCGAGTGGTGCAACCGGCTGCTGGCGGCCATCTCTGCACATCCCCCGC  
CGCATCCGCCAGGGCTTCGAGCGCGCCCTGCTGTAA



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Fig. 61A

2003 CON 12 BF Env

MRVRGMQRNWOHLGKWGLLFLGLIIICNATENLWVTYYGVVWKEATTLFCASDAKSYEREVHNWVATHACVPTDPNPQEVLDENVTF  
 DMWKNMVEQMHTDIIISLWQSLKPCVKLTPLCVTLNCTDANATANATKEHPEGRAGAIQNCSEFNTTEVRDKQMKVQALFYRLDIVPISDN  
 NSNEYRLINCNTSTITQACPQVSWDPIPIHYCAPAGYAILKCNCKFNGTGPCKNVSTVQCTHGKIPVSTQLLNGSLAEEIIIRSONIS  
 DNAKTIIVHLNESVQINCTRPNNTRKSIHIGPGRAFYATGDIIGDIRKAHCNVSTQWNKTLQVKKKLRSYFNTTIKENSSSGGDPEITM  
 HSFCRGEFFYCNTSKLFNDTVSNDTIILPCRIKQIVNMWQEVGRAMYAAPIAGNITCTSNITGLLLTRDGGHNETKTETFRPGGNNMKDN  
 WRSELYKYKVVIEPLGVAPTRAKRQVVKREKRAVGIGALFLGLGAAGSTMGAASITLTVOARQLLSGIVQQSNLLRAIEAQOHLIQLTV  
 WGIKQOARVLAVERYLKDQQLGLWGCSGKLICTTNVPWNSSWSNKSQEEIWNMTWMEWEKEINNYSEIYRLIEESQOQEKNEQELLA  
 LDKWASLWNWFDISNWLWYIRIFIMIVGGLIGLRIVFAVLSIVNRVRKGYSPLSLOTHIPSPREPDRPEGIEEGGEGQKDRSVRLVNGFLA  
 LIWDDLRLSLCLFSYHRLRDLIIIVTRIVELLGRRGWEVLKYWNLLQYWSQELKNSAISLLNTTAIVVAEGTDRVIEALQVRVGRAILNIPRR  
 IRQGLERALL\$

Fig. 62A

2003 CON 14 BG Env

MKAKGTQRNWOHLGKWGLLILGLVIIICASNDLWVTYYGVVWKEATTLFCASDAKAYDAEVHNWVATHACVPTDPNPQEVLENVTENF  
 NMWENNMDQMEDIIISLWQSLKPCVELTPLCVTLNCTDFNNTNNTNTRNDGEGEIKNCSEFNTTSLRDKIKKEYALFYRLDIVQMDND  
 NSSYRLTSCNTSIIITQACPQVSTPIPIHYCAPAGFVILKCNKFTNGTGPCTNVSTVQCTHGIRPVVSTQLLNGSLAEEIIIRSKNFTD  
 NAKTIIVOLKDPFIEINCTRPNNTRKRITMGPGRVLYTTGQIIGDIRKAHCNISKTWNNTLGQIVKKLREQFMNKTIVFQSSSGGDPEIVM  
 HSFCRGEFFYCNTTQLENSTWRSNSTWNTTETNNTDLITLPCRKQIVNMWQKVGKAMYAPPISGQIRCSSNITGLLLIRDGGSNNTETF  
 RFGGNNMKDNWRSELYKYKVVKIEPLGVAPTRAKRRVVRQREKRAVGIGALIFGLGAAGSTMGAASMTLTVOARQLLSGIVQQOQNNLLRAIE  
 AQOQMLQLTWGIKQOARVLAVERYLKDQQLGIWGCSCGLICTTVPWNASWSNKSLLDIWNMTWMEWEEREIDNYTGLIYTLIEQSONQ  
 QERNEQELLELDKWASLWNWFNITNWLWYIKIFIMIGGLIGLRIVFAVLSIINRVKGYSPLSFQTLTHHQREPDPRGRIEEEGEGEQDKDR  
 SIRLVSGFLALAWDDLRLSLCLFSYHRLRDFILIAARTVELLGRSSLKGLRIGWEGLYLWNLLLYWGRELKNSAINLLDTVAIAVANWTDRA  
 IEVVRVGRAVLNIPVRIRQGLERALL\$

[illegible]

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**Fig. 62B**

2003 CON\_14\_BG Env.seq.opt

ATGAAGGCCAAGGGCACCCAGCGCAACTGGCAGTCCCTGTGGAAGTGGGCACCCCTGATCCTGTGGCCCTGGTGATCATCTGCTCCGCCCTCCAA  
CGACCTGTGGTGACCGTGTACTACGGCGTGCCCGTGTGGAAGGAGGCCACCAACCCCTGTTCTGCGCTCCGACGCCAAGCCTACGACG  
CCGAGGTGCACAACGTGTGGCCACCCACGCTGCGTGCCACCGACCCCAACCCAGGAGTGGCCCTGGAGAACGTGACCGAGAACTTC  
AAACATGTGGGAGAACAAACATGTTGGACCAAGATCAGGAGGACATCATCTCCTGTGGACCACTCCTGAAGCCCTGCGTGGAGCTGACCCC  
CCTGTGCGTGACCCCTGAACCTGCACCGACTTCAACAAACACCAACCAACACCCGCAACGAGCGGCGAGGCGAGATCAAGAACT  
GCTCCTTCAACATCACCACTCCCTGCGGACAAGATCAAGAAGAGTACGCCCTGTTCTACAACCTGGACGTGGTGCAGATGGACAACGAC  
AACTCCTCTACCGCTGACCTCCTGCAACACCTCCATCATCACCCAGGCTGCCCAAGGTGCTTCAACCCCATCCCATCCACTACTG  
CGCCCCCGCGCTTCGTGATCCTGAAGTCAACAAGACCTTCAACGGCACCGGCCCTTGCAACAAAGTGTCCACCGTGCAGTGCACCC  
ACGGCATCGCCCCGTGTTCCACCCAGTCTGCTGAACGGTCCCTGGCCGAGGAGGATCGTGATCCGCTCCAAGAACTTCAACCGAC  
AAAGCCAAAGACCATCATCTGTCAGCTGAAGGACCCCATCGAGATCAACTGCACCCGCCCAACAACAACCCGCAAGCGCATCACCATGGG  
CCCCGGCCGCTGTGTACACCAACCGCCAGATCATCGGGACATCCGCAAGGCCACTGCAACATCTCCAAGACCAAAGTGAACAACACCC  
TGGGCCAGATCGTGAAGAACTGCGCGAGCAGTTTCTACTGCAACACCAACCAAGTGTTCAACTCCACTGGCGCTCCAACCTCCACCTGGAACGACAC  
CACTCCTTCAACTGCGCGCGGAGTTCTTCTACTGCAACACCAACCAAGTGTTCAACTCCACTGGCGCTCCAACCTCCACCTGGAACGACAC  
CACCGAGACCAACAACACCGACCTGATCACCTGCTCCCGCATCAAGCAGATCGTGAACATGTGGCAGAAAGTGGGCAAGGCCATGTACG  
CCCCCCCCATTCGGGCCAGATCCGCTGCTCCTCCAACATCACCGGCTGTGTAAGTCAAGTGGTGAAGATCGAGCCCTGGCGTGGCCGCCAC  
CGCCCCGGCGGCAACATGAAGGACAACTGGCGCTCCGAGCTGTACAAGTCAAGTGGTGAAGATCGAGCCCTGGCGCTGGCCGCCAC  
CGCGCCAAAGCCGCGTGTGCAGCGCGGAGAGCGCGCTGGCATCGCGCCCTGCTGTTCGGCTTCCTGGCGCGCCGCCGCTCCACCA  
TGGCGCGCCCTCCATGACCTGACCGTGCAGGCCCGCCAGTGTGTCGGCATCGTGCAGCAGACAACCTGCTGCGCGCCATCGAG  
GCCCAGACGACATGTGCACTGACCTGACCGTGGGGCATCAAGCAGTGCAGGCCCGCGTGTGGCGTGGAGCGCTACTGAAGGACCAAGCA  
GCTGCTGGGCATCTGGGCTGCTCCGGCAAGTGTGCAACCAACCGTGCCTGGAACGCTTACACCTGATCTACACCTGATCGAGCAGTCCCGAAGACCA  
TCTGGAACAACATGACCTGATGGAGTGGAGCGCGAGATCGACAACACCGGCTCCCTGTGGAACCTGGTCAACATCACCACTGGCTGTGGTACATCAA  
CAGGAGCGCAACAGCAGGAGCTGCTGGAAGTGGACAAGTGGCCCTCCCTGTGGAACTGGTTCAACTCACCACTGGCTGCGCAAGGCTACTCC  
GATCTTTCATCATGATCATCGCGGCTGATCGGCCCTGCGCATCGTGTTCGCCGTGCTGTCCATCATCAACCGCTGCGCAGGCAAGGCTACTCC  
CCCTGTCTTCCAGACCTGACCCACCAAGCGGAGCCCGACCGCCCGGACCTGCGCTGGACGACCTGCGCTCCCTGTTCTTCTACCAACCGCTGCGGACTTCAT  
TCCATCCGCTGTGTTCGGCTTCCTGGCCCTGGGACGACCTGCGCTGGAGCGAGTCCCTCCCTGAAGGCTGCGCTGGGAGGCTGAAGTACCTGTGGAAC  
CCTGATCGCCCGCCGACCGTGGAGTGTGGGCGCTCCCTCCCTGAAGGCTGCGCTGGGAGGCTGCGCTGGCCCTGCGGACTTCAT  
TGCTGCTGTACTGGGCGCGGAGTGAAGAACTCCGCCATCAACCTGCTGGACACCGTGGCCATCGCCGTGGCCAACTGGACCGACCGCGC  
ATCAGGTTGTTGACGCGCTGGCGCGCGCTGTGAACATCCCCGTGGCATCCGCCAGGCTGGAGCGCGCCCTGCTGTAA

## Centralized HIV-1 gag/nef/pol Protein and the Codon-optimized Gene Sequences

## Fig. 63A

1. 2003\_CON\_S\_gag.PEP  
 MGARASVLSGGKLD AWEKIRLRPGKKKYRLKHLVWASRELERFALNPGLLETSEGCCQIIHQLOPALQQTGSEELRSLYNTVATLYCVHQRI  
 EVKDTKEALDKIEEEQNSKQKTQQAADTGNSSKVSQNYPIVQNLQGMVHQAISPRTLNWVKVVEEKAFSPEVIPMFSALSEGATPQDL  
 NTMLNTVGGHQAAMQMLKDTINEEAAEWDRLHPVHAGPIPPGQMRPRGSDIAGTTSTLQEQIGWMTSNPPIPVGEIYKRWIILGLNKIVRM  
 YSPVSILDIRQPKPEFRDYVDRFFKTLRAEQATQDVKNWMTDTLLVQANPDCKTILKALPGATLEEMMTACQGVGPPSHKARVLAEMS  
 QVTNTTIMQRGNFKGQKRIKCFNCGKEGHIA RNCRAPRKKGCKWKCKGEGHQMKDCTERQANFLGIWPSNKGKRPNGNLFQSRPEPTAPPAAE  
 SFGFGEIITPSPKQEPKDKELYPLASLKSFLFGNDPLSQ\$

## Fig. 63B

2003\_CON\_S\_gag.OPT  
 ATGGGCGCCGCGCCTCCGTGCTGTCCGGCGGCAAGCTGGAGCGCCTGGGAGAAGATCCGCCCTGGCCCCCGGCGGCAAGAAGTACCGCCT  
 GAAGCACCTGTGTGGCCTCCCGGAGCTGGAGCGCTTCGCCCTGAACCCCGCCTGTGAGACCTCCGAGGCTGCCAGCAGATCATCG  
 AGCAGCTGCAGCCCGCCTGCAGACCGGCTCCGAGGAGCTGCGCTCCCTGTACAACACCGTGGCCACCTGTACTGCGTGACACCGCATC  
 GAGGTGAAGGACACCAAGAGGCCCTGGACAAGATCGAGGAGGAGAGAACAAAGTCCAAGCAGAAGACCCAGCAGGCCGCCGCCGACACCGG  
 CAACTCCTCCAAGGTGTCCAGAACTACCCATCGTGCAGAACCTGCAGGCGCAGATGGTGACACGAGCCATCTCCCCCGCACCTTGAACG  
 CCTGGGTGAAGTGGTGGAGGAGAAGGCTTCTCCCCGAGGTGATCCCCATGTTCTCCGCCCTGTCCGAGGGGCCACCCCCCAGGACCTG  
 AACACCATGCTGAACACCGTGGCGGCCACACGCGCCCATGCAGATGCTGAAGGACACCATCAACGAGGAGGCCGCCGAGTGGGACCCGCT  
 GCACCCCGTGCACCGCGCCCATCCCCCGGCAGATGCGCGAGCCCCCGGCTCCGACATCGCCGGCACCACTCCACCTGCGAGGAGC  
 AGATCGGCTGGATGACCTCAACCCCCCATCCCCGTGGCGAGATCTACAAGCGTGGATCATCCTGGGCTGAACAAGATCGTGGCATG  
 TACTCCCCGTGTCATCTGGACATCCGCGAGGCCCAAGGAGCCCTTCCGCGACTACGTGACCGCTTCTTCAAGACCTGCGCGCCGA  
 GCAGGCCACCCAGGACGTGAAGACTGGATGACCGACACCCCTGCTGTGCAGAACGCCAACCCCGACTGCAAGACCATCTGAAGGCCCTGG  
 GCCCGGCGCCACCTGGAGGAGATGATACCGCTGCCAGGGCGTGGCGGCCCTCCCAAGGCCCGCTGTGGCGAGGCCCATGTCC  
 CAGGTGACCAACACCAACCATCATGATGCAGCGCGGCAACTTCAAGGCCAGAACGCGCATCATCAAGTGTCTCAACTGCGGCAAGGAGGCCA  
 CATCGCCGCAACTGCCGCGCCCCCGCAAGAGGGCTGCTGGAAGTGGGCAAGGAGGCCACACAGATGAAGACTGCACCGAGCGCCAGG  
 CCAACTTCTGGGCAAGATCTGGCCCTCCAAAGGGCGCCCGGCCAACTTCTGCACTCCGCCCCGAGCCACCGCCCCCGCCGAG  
 TCCTTCGGCTTCGGCGAGGAGATCACCCCTCCCAAGCAGGAGGCCCAAGGACAGGAGTGTACCCCTTGGCCTCCCTGAAGTCCCTGTT  
 CGGCAACGACCCCTGTCTCCAGTAA

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Fig. 64A

**2. 2003 M.GROUP.anc gag. PEP**

MGARASVLSGGKLD AWEKIRLRPGGKKYRIKHLVWASRELERFALNPGLLLETAEGCQOIMQLPALQTGTTELRSLYNTVATLYCVHQRI  
 EVKDTKEALDKIEEEQNKSSQKTQAAADKGDSSQVSNYPVIVNLQGMVHQAISPRITLNAWVKVVEKAFAFSPEVIPMFSALSEGATPQDL  
 NMTLNTVGGHQAAMQMLKDTINEEA AEWDRLLHPVHAGPIPPGQMRPRGSDIAGTTSTLQEIQIGWMTSNPPIPVGEIYKRWIILGINKIVRM  
 YSPVSILDIRQGPKEFRDYVDRFFKTLRAEQATQDVKNWMTDTLLVQANPNPCKTILKALPGATLEEMMTACQVGGPGHKARVIAEAMS  
 QVTNANIMMQRGNFKGPRRIIVKFCNCGKEGHIARNCRAPRKKGCKWCKGEGHQMKDCTERQANFLGKIWPSNKGPRGNFLQSRPEPTAPPAAE  
 SFGFGEIITPSPKQEPKDKELYPLASLSLFGSDPLSQ\$

Fig. 64B

**2003 M.GROUP.anc gag.OPT**

ATGGCGCGCGCGCTCCGTGCTGTCCGGCGGCAAGCTGGACGCTGGGAGAAGATCCGCTCGGCCCGGGCAAGAAGTACCGCCT  
 GAAGCACCTGGTGTGGGCTCCCGCGAGCTGGAGCGCTTCGCCCTGAACCCGGCCTGTCTGGAGACCGCCGAGGGCTGCCAGCAGATCATGG  
 GCCAGCTGACGCCGCTGCAGACCGGCAACCGAGGAGCTGGCTCCCTGTACAACACCGTGGCCACCTGTACTGCGTGCAACGAGCATC  
 GAGTGAAGGACACCAAGGAGGCTGGACAAGATCGAGGAGGAGCAAGTCCAGCAGAAGACCCAGCAGGCCGCCGCCGACCAAGG  
 CGACTCCTCCAGGTGTCCAGAACTACCCCATCGTGCAGAACCTGCAGGGCCAGATGGTGCACCAGGCCATCTCCCCCGCACCTGAACG  
 CCTGGGTGAAGGTGGAGGAGAAGGCTTCTCCCGAGGTGATCCCATGTTCTCGCCCTGTCCGAGGGCGCCACCCCGAGGACCTG  
 AACACCATGCTGAACACCGTGGCGGCGCACAGGCCGCGCATGCAGATGCTGAAGGACACCATCAACGAGGAGGCCCGGAGTGGGACCGCT  
 GCACCCCGTGCAAGCGGCCCATCCCGCGGCGAGATGCGGAGCCCCCGGCTCCGACATCGCCGCAACCATCCACCTCCAGGAGC  
 AGATCGGCTGGATGACCTCCAACCCCGCATCCCGTGGCGAGATCTACAAGCGCTGGATCATCTGGGCCCTGAACAAGATCGTGGCATG  
 TACTCCCGCTGTCCATCCTGGACATCCGCCAGGCGCCCAAGAGCCCTTCGCGACTACGTGGACCGCTTCTTCAAGACCTGCCGCCCGA  
 GCAGGCCACCCAGGACGTGAAGACTGGATGACCGCACCCCTGCTGGTGCAAGACGCCAACCCCGACTGCAAGACCATCTGAAGGCCCTGG  
 GCCCGGCGCCACCCCTGGAGGAGATGATGACCGCTGCCAGGGCGGCAACTCAAGGGCCCCCGCGCATCGTGAAGTGTCAACTGCGGCAAGGAGGCA  
 CAGTGACCAACGCCAACATCATGATGCAGCGCGGCAACTCAAGGGCCCCCGCGCATCGTGAAGTGTCAACTGCGGCAAGGAGGAGGCA  
 CATCGCCGCAACTGCCGCGCCCCCGCAAGAGGCTGCTGGAAGTGGGCAAGGAGGCCACAGATGAAGGACTGCACCGAGCGCCAGG  
 CCAACTTCTGGSCAAGATCTGGCCCTCCAAACAAGGGCGCCCCCGGCAACTTCTGAGTCCGCCCCGAGCCACCGCCCCCGCCGAG  
 TCCTTCGGCTTCGGCGAGGAGATCACCCCTCCCCCAAGCAGGAGGCCCAAGGACAAGGAGCTGTACCCCTGGCCTCCCTGAAGTCCCTGTT  
 CGGCTCCGACCCCTGTCCAGTAA

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Fig. 65A

3. 2003 CON A1 gag.PEP  
 MGARASVLSGGKLD AWEKIRLRPGGKKYRLKHLVWASRELERFALNPSSLLETTEGCGQIMEQLQPALKTGTEELRSLYNTVATLYCVHQRI  
 DVKDTKEALDKIEEI QNKSQKTQAAADTGNSSKVSQNYPIVQNAQGMVHQSLSPTRLNAWVKVIEEKAFSPEVIPMFSA LSEGATPQDL  
 NMMLNIVGGHQAMQMLKDTINEEAAEWDRILHPVHAGPIPPGQMRPRGSDIAGTTSTPOEQIGWMTGNPPIPVGDIYKRWIIILGNKIVRM  
 YSPVSILDIKQGPKEPFRDYVDRFFKTLRAEQATQEVKNWMTETLLVQNANPDCKSILRALPGATLEEMTACQGVGGPGHKARVLAEAMS  
 QVOHTNIMMQRGNFRGQKRIKCFNCGKEGHLARNCRAPRKKGCKGKEGHQMKDCTERQANFLGKIWPSSKGRPNFPQSRPEPTAPPAEI  
 FGMGEIITSPPKQEQKDREQDPPIVLSKSLFGNDPLSQ\$

Fig. 65B

3. 2003 CON A1 gag.OPT  
 ATGGGCGCCCGCGCCTCCGTGCTGTCCGGGGCAAGCTGGACGCTGGAGAGATCCGCTGCGCCCCGGGGCAAGAAGTACCGCCT  
 GAAGCACCTGGTGTGGCCTCCCGGAGCTGGAGCGCTTCGCCGTGAACCCCTCCCTGCTGGAGACCAACCGAGGGTGCAGAGATCATGG  
 AGCAGCTGCAGCCCGCCTGAAGACCGGCAACGAGAGCTGCGTCCCTGTACAACACCGTGGCCACCCTGTACTGCGTGCAACGCGCATC  
 GACGTGAAGGACACCAAGGAGGCCCTGGACAAGATCGAGGAGATCCAGAACAGTCCAAGCAGAAGACCCAGCAGGCCGCCGACACCGG  
 CAACTCCTCCAAGGTGTCCAGAACTACCCATCGTGCAGAACGCCAGGCCAGATGGTGACCAAGTCCCTGTCCCGGCGCCACCCAGGACCTG  
 CCTGGGTGAAGGTGATCGAGGAGAGGCTTCTCCCGAGGTGATCCCATGTCTCCGCTGTCCGAGGGCGCCACCCAGGACCTG  
 AACATGATGCTGAACATCGTGGCGGCCACAGGCCGCTGAGATGCTGAAGGACACCATCAACGAGGAGCGCGGAGTGGGACCGCCT  
 GCACCCGTGCACCGCGGCCCATCCCGCGCCAGATGCGGAGCCCGGCTCCGACATCGCGGACCACTCCACCCCGCAGGAGC  
 AGATCGGCTGGATGACCGGCAACCCCGCATCCCGCGCCAGATGCGGAGATCTACAAGCGCTGGATCATCTGGGCTGAACAGATCGTGCGCATG  
 TACTCCCCGTGTCATCCTGGACATCAAGCAGGGCCCCAAGAGACCTTCCGCGACTACGTGGACCGCTTCTTCAAGACCTGCGGCGCGA  
 GCAGGCCACCCAGAGGTGAAGAACTGGATGACCGAGACCTGCTGGTGCAGAACGCCAACCCGACTGCAAGTCCATCCTGCGGCGCCTGG  
 GCGCGCGCCACCTGGAGGAGATGATGACCGCTGCCAGGCGTGGCGGCCCGGCCACAAGGCCCGCGTGTGCGGAGGCCATGTCC  
 CAGGTGCAGCACACCAACATCATGATGCAGCGCGCAACTTCCGCGGCCAAGAGCGCATCAAGTGTTCAACTGCGGCAAGGAGGCCACCT  
 GGCCCGCAACTGCCGCGCCCCCGCAAGAGGCTGCTGGAAGTGGGCAAGGAGGCCACCAAGATGAAGGACTGCAACGAGCGCCAGGCCA  
 ACTTCTGGCAAGATCTGCCCCCTCTCCAAGGCGGCCCGCGCAACTTCCCGAGTCCCGCCCCGAGCCACCGCCCCCGCGGAGATC  
 TTCGGCATGGCGGAGGAGATCACCTCCCCCCCCCAAGCAGGAGCAGAGGACCGGAGCAGGACCCCCCTGGTGTCCCTGAAGTCCCTGTT  
 CGGCAACGACCCCCCTGTCCAGTAA

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Fig. 65C

## 4. 2003 A1.anc gag.PEP

MGARASVLSGGKLDAAWKIRLRPGGKKYRLKHLVWASRELERFALNPGLLETAEGCCQIMQQLQPALKTGTEELRSLYNTVATLYCVHORI  
 EVKDTKEALDKIEEIQNKSQKTQAAADTGNSSKVSQNPVIVQAQGMVHQSLSPTLNWVVKVIEKAFSPEVIPMFSALEGATPQDL  
 NMMLNIVGGHQAAQMMLKDTINEEAAEWDRLHPVHAGPIPPGQMPREPRGSDIAGTTSTLQEQIGWMTGNPPIPVGDIYKRWIILGLNKIVRM  
 YSPVSLDIRQGPKEPFRDYVDRFFKTLRAEQATQEVKNWMTETLLVQNANPDCKSILRALPGATFLEEMTACQGVGGPGHKARVLAEMS  
 QVQNTDMMQRGNFRGPKRIKCFNCGKEGHLARNCRAPRKKGWCKGKEGHQMKDCTERQANFLGKIWPSSKGRPGNFPQSRPEPTAPPAEN  
 FGMGEMISSPKQEQKDRQYPLVLSKSLFGNDPLSQ\$

Fig. 65D

## 2003 A1.anc gag.OPT

ATGGCGCCCGCGCTCCGTGTCTCGGCGGCAAGCTGGACGCTGGGAGAAGATCCGCCCTGCGCCCGCGGCAAGAAGTACCGCCT  
 GAAGCACTGTGTGGGCTCCCGGAGCTGGAGCGCTTCGCCCTGAACCCCGGCTGCTGGAGACCGCGGAGGCTGCCAGAGATCATGG  
 GCCAGCTGCAGCCCGCTGAAGACCGGACCGGAGCTGCGCTCCCTGTACAACACCGTGGCCACCTGTACTGCGTGCACCGGCATC  
 GAGGTGAAGGACACCAAGGAGGCCCTGGACAAGATCGAGGAGATCCAGAACAGTCCAAGCAGAAGACCCAGCAGGCCCGCCGACACCGG  
 CAATCCTCCAGGTGTCCAGAACTACCCCATCGTGCAGAACGCCAGGCCAGATGTTGTCACCAAGTCCCTGTCCCCCGCACCTGAACG  
 CCTGGTGAAGTGATCGAGGAGAAGCCTTCTCCCCGAGGTGATCCCCATGTTCTCCGCCCTGTCCGAGGCGCCACCCAGGACCTG  
 AACATGATGCTGAACATCGTGGCGGCCACCGCCGATGCAGATGCTGAAGGACACCATCAACGAGGAGCGCGGAGTGGGACCGCCT  
 GCACCCCGTGCACGCGGCCCAACCCCATCCCCGCGGAGATGCGGAGCCCCCGGCTCCGACATCGCCGGCACCATCCACCTGCAGGAGC  
 AGATCGGTGGATGACCGGCAACCCCATCCCCGTGGCGACATCTACAAGCGCTGGATCATCTTGGCTGAACAAGATCGTGCGCATG  
 TACTCCCCGTGTCCATCTGGACATCCGCAAGGCCCAAGGAGCCTTCCGCGACTAGTGGACCGCTTCTTCAAGACCTGCGCGCCGA  
 GCAGGCCACCCAGGAGTGAAGAACTGGATGACCGAGACCTGTGTGTGCAGAACGCCAACCCGACTGCAAGTCCATCCTGCGCGCCTGG  
 GCCCCGCGCCACCTGGAGGAGATGATGACCGCTGCCAGGCGGTGGCGGCCCGGCCACAAGGCCCGGTGCTGGCCGAGGCCATGTCC  
 CAGTGCAGAACACCGACATCATGATGCAGCGCGGCAACTTCCGCGGCCCAAGCGCATCAAGTGTCTCACTGCGCAAGGAGGCCACCT  
 GCGCCGCAACTGCGCGCCCCCGCAAGAGGCTGTGGAAGTGGGCAAGGAGGCCACCCAGATGAGGACTGCACCGAGCGCCAGGCCA  
 ACTTCTGGGCAAGATCTGGCCCTCTTCAAGGCGGCCCGGCAACTTCCCCAGTCCCCCGGAGCCACCGCCCCCGCCGAGAAC  
 TTCGGCATGGCGGAGGAGATGATCTCTTCCCCCAAGCAGGAGCAGGACCGGAGCAGTACCCCCCTGGTGTCCCTGAAGTCCCTGTT  
 CGGCAACGACCCCTGTCCCAGTAA

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Fig. 66A

## 5. 2003 CON A2 gag.pEP

MGARASILSGKLDWEKIRLRPGGKKYRLKHLVWASRELEKFSINPSLLETSEGRQIIRQLPALQTGTEELKSLYNTVAVLYCVHQRI  
 DVKDTKEALDKIEEONKCKQKTOHAAADTGNSSSSQNYPIVQNAQGMVHQAI SPRTLNAWKVVEEKAFSPEVIPMTALSEGATPQDL  
 NTMLNTVGGHQAAOMQLKDTINEEAAEWDRLHPVHAGPIPPGQMRPRGSDIAGTSTLQEQIGWMTSNPPIPVGEIYKRWIIILGLNKIVRM  
 YSPVSIIDIRQGPKEPFRRDYVDRFFKTLRAEQATQEVKNWMTDTLLVQANPDCKSILRALPGATLEEMMTACQGVGGPSHKARVLAEMS  
 QVQNTNTNIMQRGNEFRGQKRIKCFNCGKEGHLARNCRAPRKKGCKGEGHQMCKDCTERQANFLKIWPSNKGPRGNFPQSRTEPTAPPA  
 ENLRMGEEITSSLKQELKTRPYNPAISLKSIFGNDPLSQ\$

Fig. 66B

## 2003 CON A2 gag.OPT

ATGGCGC<sup>1</sup>CGCGCCTCCATCCTGTCCGGGGCAAGCTGGACGCCCTGGGAGAAGATCCGCCTGCGCCCCGGGGCAAGAAAGTACCGCCT  
 GAAGCACCTGGTGTGGGCTCCCGGAGCTGGAGAAGTTCTCCATCAACCCCTCCCTGTGGAGACCTCCGAGGGTGGCGCAGATCATCC  
 GCCAGCTGCAGCCCGCCTGCAGACCGGCACCGAGGAGCTGAAGTCCCTGTACAACCCGTGGCGTGTACTGCTGCACCGCGCATC  
 GACGTGAAGGACACCAAGGAGGCCCTGGACAAGATCGAGGAGGAGCAGAACAGTGCAAGCAGAACCCAGCACGCCCGCGCACACCGG  
 CAACTCCTCCTCCTCCAGAACTACCCCATCGTGCAGAACGCCAGGCCAGATGGTGCACAGGCCATCTCCCCCGCACCCCTGAACG  
 CCTGGTGAAGTGGTGGAGGAGAAGCCTTCTCCCCGAGGTGATCCCATGTTACCGCCCTGTCCGAGGGCGCCACCCCGCAGGACCTG  
 AACACCATGCTGAACACCGTGGCGGCCACAGGCCCATGCAGATGCTGAAGGACACCATCAACGAGGAGGCCCGCGAGTGGGACCGCCT  
 GCACCCCGTGACGCCGGCCCATCCCCCGGCCAGATGCGCGAGCCCGCGGCTCCGACATCGCCGACATCGCCGACCTCCACCTGCAGGAGC  
 AGATCGGCTGGATGACCTCCACCCCCCATCCCGTGGCGAGATCTACAAGCGCTGGATCATCCTGGGCTGAACAAGATCGTGGCATG  
 TACTCCCCGTGTCCATCCTGGACATCCGCCAGGCCCAAGGAGCCCTTCCGCGACTACGTGGACCGCTTCTTCAAGACCTTGGCGCCGA  
 GCAGGCCACCGAGGAGTGAAGAACTGGATGACCGACACCCCTGCTGGTGCAGAACGCCAACCCGACTGCAAGTCCATCCTGCGCGCCCTGG  
 GCCCCGGGCCACCTGGAGGAGATGATGACCGCCTGCCAGGGCGTGGCGGCCCTCCACAAAGGCCCGCTGCTGGCCGAGGCCATGTCC  
 CAGGTGCAGAACACCAACACCAATCATGATGCAGCGCGCAACTTCCGCGGCCAGAACGCGCATCAAGTCTTCAACTGCGGCAAGGAGG  
 CCACCTGGCCCGCAACTGCCGCGCCCGCGCAAGAGGGCTGCTGGAAGTGGGCAAGGAGGCCACCCAGATGAAGGACTGCCACCGAGCGCC  
 AGGCCAACTTCTGGGCAAGATCTGGCCCTCCAACAAGGGCCCGCCCGCAACTTCCCCAGTCCCCGACCGAGCCACCGCCCCCGCC  
 GAGAACCTGGCATGGCGGAGGAGATCACCTCCTCCCTGAAGCAGGAGCTGAAGACCCCGGAGCCCTACAACCCCGCCATCTCCCTGAAGTC  
 CCTGTTCGGCAACGACCCCTGTCCCAGTAA

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Fig. 67A

**6. 2003 CON B gag.pEP**

MGARASVLSGGELDRWEKIRLRPGGKKKKYKLKHIVWASRELERFAVNPGLLETSEGRQILQLPSLQTGSEELRSLYNTVATLYCVHQRI  
 EVKDTKEALEKIEEEQNKSKKKAQAAADTGNSSQVSQNYPIVQNLQGMVHQAISPRTLNAWKVVEEKAFSPEVIPMFSALSEGATPQDL  
 NTMLNTVGGHQAAMQMLKETINEEAAEWDRLHPVHAGPIAPGQMRPRGSDIAGTSTLQEQIGWMTNNPPIPVGEIYKRWIILGLNKIVRM  
 YSPTSIDIRQGPKEPFDRDYVDRFYKTLRAEQASQEVKNWMTETLLVQANPDCKTILKALGPAATLEEMMTACQGVGPGHKARVLAEAMS  
 QVTNSATIMMQNGNFRNQRTVKCFNCGKEGHIKNCRAPRKKGCWKCKEGHQMCKDCTERQANFLGIWPSHKGRPGNFLOSRPEPTAPPE  
 ESFRFGEETTPSQKEPIDKELYPIAS\$

Fig. 67B

**2003 CON B gag.OPT**

ATGGGCGCCGCGCCTCCGTGCTGTCCGGGGCGGAGCTGGACCGCTGGGAGAAGATCCGCCCTGGCCCCGGCGGCAAGAAGTACAAGCT  
 GAAGCACATCGTGTGGGCTCCCGGAGCTGGAGCGCTTCGCCGTGAACCCGGCTGTGGAGACCTCCGAGGGCTGCCGCCAGATCCTGG  
 GCCAGCTGCAGCCCTCCCTGCAGACCGGCTCCGAGGAGCTGCGCTCCCTGTACAAACACCGTGGCCACCCCTGTACTGCGTGCACCAAGCGCATC  
 GAGGTGAAGGACACCAAGGAGGCCCTGGAGAAGATCGAGGAGGAGCAGAACAACTCCAAAGAAGAGGCCAGAGGCCGCGCCGACACCCGG  
 CAACTCCTCCAGGTGTCCAGAACTACCCCATCGTGCAGAACCTGCAGGGCCAGATGGTGACAGGCCATCTCCCCCGCACCCCTGAACG  
 CCTGGGTGAAGGTGGTGGAGGAGAAGGCCCTTCTCCCCGAGGTGATCCCCATGTTCTCCGCCCTGTCCGAGGGCGCCACCCCCCAGGACCTG  
 AACACCATGCTGAACACCGTGGCGGCCACCAAGGCCCATGCAGATGCTGAAGGAGACCATCAACGAGGAGGCCCGCGAGTGGACCCGCT  
 GCACCCCGTGCACGCCGCCCATCGCCCCCGGCCAGATGCGCGAGCCCCCGGCTCCGACATCGCCGGCACCACTCCACCCCTGCAGGAGC  
 AGATCGGCTGGATGACCAACAACCCCCCATCCCCGTGGGCGAGATCTACAAGCGCTGGATCATCTGGGCCCTGAACAAGATCGTGCGCATG  
 TACTCCCCACCTCCATCTGGACATCCGCCAGGGCCCCAAGGAGCCCTTCCCGGACTACGTGGACCGCTTCTACAAGACCCCTGCGGCCGA  
 GCAGGCTCCCGAGGAGTGAAGACTGGATACCGAGACCCCTGTGTGCAGAACGCCAACCCCGACTGCAAGACCATCTCTGAAGGCCCTGG  
 GCCCCGCCACCCCTGGAGGAGATGATGACCCGCTGCCAGGGCGTGGGCGGCCCCCGGCCACAAGGCCCGCTGTGCTGCCGAGGCCATGTCC  
 CAGGTGACCAACTCCGCCACCATCATGATGCAGCGCGGCAACTTCCGCAACCAAGCGCAAGACCCGTGAAGTCTCAACTGCGGCAAGGAGGG  
 CCACATCGCCAGAAGTCCCGCCCCCGCAAGAGGGCTGCTGGAAGTCCGCAAGGAGGCCCAACAGATGAAGGACTGCACCGAGCGCC  
 AGGCCAACTTCTTGGGCAAGATCTGGCCCCCTCCCAACAAGGGCCCCCGGCAACTTCTCTGAGTCCCCCGCCGAGCCACCGCCCCCGGAG  
 GAGTCCCTTCCGCTTCCGGCGAGGAGACCAACCCCCCTCCCAAGAAGGAGGCCCATCGACAAGGAGCTGTACCCCTGGCCTCCTAA

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## Fig. 67C

## 7. 2003 B. anc gag. PEP

MGARASVLSGGKLDKWEKIRLRPGGKKYKLIHVWASRELERFAVNPGLLETSEGCRQIILQLOPALQOTGSEELRSLYNTVATLYCVHQRI  
 EVKDTKEALDKIEEEQNKSKKKAQAAADTGNSSQVSNYPVQNLOQMVMHQAI SPRTLNAWKVVEEKAFSPEVIPMFSALSEGATPQDL  
 NTMLNTVGHHQAAMQMLKETINEEAAEWDRLHPVHAGPIAPGQMPREPRGSDIAGTTSTLQEQIGWMTNNPPIPVGEIYKRWIIILGLNKIVRM  
 YSPISILDIRQGPKEPFRDYVDRFYKTLRAEQASQDVKNWMTETLLVQNPANPDCKTILKALGPAATLEEMTACQGVGGPGHKARVLAEAMS  
 QVTNSTTIMMQRGNFRDQKIVKCFNCGKEGHIARNCRAPRKKGCKGKEGHQMKDCTERQANFLGKIWPSHKGRPGNFIQSRPEPTAPPE  
 ESFRGEETTPSQKEPIDKELYPLASLKSIFGNDPSSQ\$

## Fig. 67D

## 2003 B. anc gag. OPT

ATGGGCGCCGCGCTCCGTGTCTCGGCGGCAAGCTGGACAAGTGGAGAAAGATCCGCTGCGCCCCCGGCGGCAAGAAAGTACAAGCT  
 GAAGCACATCGTGTGGGCTCCCGGAGCTGGAGCGCTTCGCCGTGAACCCCGGCTGTCTGGAGACCTCCGAGGGCTGCCGCCAGATCCTGG  
 GCCAGCTGAGCCCGCTTCAGACCGGCTCCGAGGAGCTCGCTCCCTGTACAAACACCGTGGCCACCCCTGTACTGCGTGCAACGCGCATC  
 GAGGTGAAGGACACCAAGAGGCCCTGGACAAGATCGAGGAGGAGCAACAAGTCCAAAGAAGAGGCCCGAGGCGCGCGCACCCG  
 CAACTCCTCCAGGTGTCCAGAACTACCCCATCTGTGCAGAACCTGCAGGGCCAGATGGTGCAACAGGCCATCTCCCCCGCACCTGAACG  
 CCTGGTGAAGGTGTGGAGGAGAGGCCCTTCTCCCCGAGGTGATCCCCATGTTCTCCGCCCTGTCCGAGGGCGCACCCCCAGGACCTG  
 AACACCATGCTGAACACCGTGGCGGCCACCAAGCCCGCATGCAGATGCTGAAGGAGACCATCAACGAGGAGCGCGCGAGTGGGACCGCT  
 GCACCCCGTGCACCGCGGCCCATCGCCCCCGGCGAGATGCGGAGCCCGCGGCTCCGACATCGCCGGCACCACTCCACCTGCAGGAGC  
 AGATCGGTGGATGACCAACAACCCCCCATCCCCGTGGCGAGATCTACAAGCGCTGGATCATCTTGGGCTGAACAAGATCGTGCGCATG  
 TAGTCCCCCATCTCCATCTTGACATCCGCCAGGGCCCCAAGGAGCCCTTCCGCGACTAGCTGGACCGCTTCTACAAGACCTTGCGCCCGCA  
 GCAGGCTCCAGGACGTGAAGAACTGGATGACCGAGACCTGTGTGTGCAAGACGCCAACCCCGACTGCAAGACCATCTGAAGGCCCTGG  
 GCCCGCGGCCACCTGGAGGAGATGATGACCGCTGCCAGGGGTGGCGGCCCGGCCACAAAGGCCCGCGTGTGGCCGAGGCCATGTCC  
 CAGGTGACCAACTCCACCATCATGATGACGCGGCAACTTCCGCGACCAAGCAAGATCGTGAAGTGTCACTGCGGCAAGGAGGG  
 CCACATCGCCCGCAACTGCCGCGCCCCCGCAAGAGGGCTGTGGAAGTGCAGGAGGAGGCCACCAAGATGAAGACTGCACCGAGCGCC  
 AGGCCAACTTCTGGGCAAGATCTGGCCCTCCCAAGGGCGCCCCCGCAACTTCTGAGTCCCCCGAGGCCACCGCCCCCGGAG  
 GAGTCCCTTCGCTTCGCGGAGGAGACCAACCCCTCCAGAGCAGGAGCCCATCGACAAGGAGCTGTACCCCTTGGCCTCCCTGAAGTC  
 CCTGTTGGCAACGACCCCTCCTCCAGTAA

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Fig. 68A

8. 2003 CON C gag. pep  
 MGARASILRGGLDKWEKIRLRPGGKKHYMLKHLVWASRELERFALNPGLLETSEGCKQIIKQLQPALQTGTTEELRSLYNTVATLYCVHEKI  
 EVRDTKEALDKIEEEQNKSSQKTQAKAADKVSQNYPIVQNLOQMWHQAISPRTLNWKVIEEKAFSPEVIMFTALSEGATPQDLNTM  
 LNTVGGHQAAMQMLKDTINEEAAEWDRHLHPVHAGPIAPGQMPREPRGSDIAGTSTLQEQIAWMTSNPPPIPVGDIYKRWIILGLNKIVRMYSF  
 VSILDIKQGPKEPFRDYVDRFFKTLRAEQATQDVKNWMTDTLLVQNANPDCKTILRALPGATLEEMMTACQGVGGPSHKARVLAEAMSQAN  
 NTNIMQRSNFKGPKRIVKCFNCGKEGHIARNCRAPRKKGCWKCGKEGHQMKDCTERQANFLGKIWPSHKGRPGNLFQNRPEPTAPPAESFR  
 FEETPAPKQEPKDRPLETSLKSLFGSDPLSQ\$

Fig. 68B

2003 CON C gag. opt  
 ATGGCGCCCGGCGCTCCATCCTGCGGCGGCAAGCTGGACAAGTGGGAGAAGATCCGCCCTGCGCCCGCGGCAAGAACACTACATGCT  
 GAAGCACTGGTGTGGCCCTCCCGGAGCTGGAGCGCTTCGCCCTGAACCCCGGCTGTGGAGACCTCCGAGGGCTGCAAGCAGATCATCA  
 AGAGCTGACGCCCGCTGCAGACCGGACCGAGGAGCTGCGTCCCTGTACAACACCCGTGGCCACCCCTGTACTGCGTGCACGAGAAGATC  
 GAGGTGCGGACACCAAGAGGCCCTGGACAAGATCGAGGAGGAGCAACAAGTCCAGCAGAAGACCCAGCAGGCCAAGGCCCGCGACCG  
 CAAGGTGTCCAGAACTACCCATCGTGCAGAACTGCAAGGCCAGATGGTGACCCAGGCCATCTCCCCCGCACCCCTGAACGCCCTGGGTGA  
 AGGTGATCGAGGAGAAGGCTTCTCCCCGAGGTGATCCCATGTTACCGCCCTGTCCGAGGGCGCCACCCCGAGGACCTGAACACCATG  
 CTGAACACCGTGGCGGCCACCAAGCGCCATGCAGATGCTGAAGGACACCATCAACGAGGAGGCCCGCGAGTGGGACCCCTGCACCCCGT  
 GCACGCGGCCCATCGCCCCCGCCAGATCGCGAGCCCCCGGCTCCGACATCGCCGGACCACTCCACCCCTGCAGGAGCAGATCGCCT  
 GGATGACCTCCAACCCCCCATCCCGTGGCGGACATCTACAAGCGTGGATCATCTGGGCTGAACAAGATCGTGCGCATGTACTCCCC  
 GTGTCCATCTGGACATCAAGCAGGGCCCCAAGGAGCCCTTCCGCGACTACGTGGACCGCTTCTCAAGACCTTGGCGCCGAGCGCCAC  
 CCAGGACGTGAAGAACTGGATACCGACACCCCTGCTGGTGCAGAACGCCAACCCCGACTGCAAGACCATCTGCGGCCCTGGGCCCCGGCG  
 CCACCTGGAGGAGATGATGACCGCTGCCAGGGCGTGGCGGCCCTCCACAAAGGCCCGCGTGTGGCCGAGGCCATGTCCAGGCCAAC  
 AACACCAACATCATGATGCAGCGCTCCAACCTCAAGGGCCCCAAGCGCATCGTGAAGTGTCAACTGCGGCAAGGAGGCCACATCGCCCG  
 CAACTGCGCGCCCCCGCAAGAGGCTGTGGAAGTGGGCAAGGAGGCCACCAAGATGAAGGACTGCACCGAGCGCCAGGCCAACTTC  
 TGGGCAAGATCTGGCCCTCCCAACAAGGGCCGCTCCCTGCAGAACCGGCCGAGCCACCGCCCCCGCGGAGTCCCTTCCGC  
 TTCGAGGAGACCAACCCCGCCCCCAAGCAGGAGCCCCAAGGAGCCCTGACCTCCCTGAAGTCCCTGTTCGGCTCCGACCCCTGTC  
 CCAGTAA

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Fig. 68C

9. 2003\_C.anc.gag.pgp

MGARASILRGCKLDTWEKIRLRPGGKHHYMIKHLVWASRELERFALNPGLLETSEGCKQIMKQLPALQGTGTEELRSLYNTVATLYCVHERI  
EVRDTKEALDKIEEONKSQKTOQAEAADGNGKVSQNYPIVQNLQGMVHQAI SPRTLNAWKVVEEKAFSPEVIPMFTALSEGATPQDL  
NTMLNTVGGHQAAMQMLKDTINEEAAEWDRLHPVHAGPVAPGQMRPRGSDIAGTSTLQEQIAWMTSNPPIPVGDIYKRWIILGLNKIVRM  
YSPVSLDIKQPKPEFRDYVDRFFKTLRAEQATQDVKNWMTDILLVQNPANPDCKTILRALPGATLEEMMTACQGVGPGHKARVLAEMS  
QANNTNMMQSRNFKPKRIVKCFNCGKEGHIARNCRAPRKKGCWKCKEGHQMCKDCTERQANFLKIPWSHKGRPGNLFQSRPEPTAPPAE  
SFRFEETTPAPKQEPKREPLTSLKSLFGSDPLSQ\$

Fig. 68D

2003\_C.anc.gag.opt

ATGGGCGCCCGCGCTCCATCCTGCGCGCGGCAAGCTGGACACCTGGGAGAAGATCCGCCCTGCGCCCGGGCAAGAACACTACATGAT  
CAAGCACCTGGTGTGGGCTCCCGGAGCTGGAGCGCTTCGCCCTGAACCCGGCTGTGGAGACCTCCGAGGCTGCAAGCAGATCATGA  
AGCAGCTGCAGCCCGCTGCAGACCGGCACCGAGGAGTGCCTCCCTGTACAACACCCGTGGCCACCTGTACTGCTGCACGAGCGCATC  
GAGGTGCGCGACACCAAGGAGGCCCTGGACAAAGTCCAGCAGAAAGACCCAGAGCCGAGCCGAGCCGCGCGGACCG  
CGACAACGGCAAGTGTCCAGAACTACCCATCGTGCAAGACTGCGAGGCGAGATGGTGCACAGGCCATCTCCCCCGCACCTGAACG  
CCTGGGTGAAGTGTGGAGGAGAAGGCTTCTCCCCGAGGTGATCCCATGTTCACCGCCCTGTCCGAGGGCGCCACCCCGAGGACCTG  
AACACCATGCTGAACACCGTGGCGGCCACAGGCCGCTATGCAGATGCTGAAGGACACCATCAACGAGGAGGCCGCGAGTGGGACCGCCT  
GCACCCCGTGACCGCGGCCCGTGGCGAGCCCGCGGCTCCGACATCGCCGACATCGCCGACACCATCCACCTGCAGGAGC  
AGATCGCCTGGATGACCTCAACCCCGCATCAAGCAGGCGGACATCTACAAGCGCTGGATCATCCTGGGCTGAACAAGATCGTGGCATG  
TACTCCCCGTGTCCATCCTGGACATCAAGCAGGCGCCCAAGGAGCCCTTCCGCGACTACGTGGACCGCTTCTCAAGACCTTGCAGCCCGA  
GCAGGCCACCCAGGACGTGAAGAACTGGATGACCGACACCCCTGCTGTGCAGAACGCCAACCCCGACTGCAAGACCATCTTGCAGCCCTGG  
GCCCGGCGCCACCTGGAGGAGATGATGACCGCTGCCAGGGCGTGGGCGGCCCGGCCCAAGGCCCGCTGTGCTGCGGAGGCCCATGTCC  
CAGGCCAACACACCAACATCATGATGACGCGCTCCAACTTCAAGGGCCCCAAGCGCATCGTGAAGTCTTCACTGCGGCAAGGAGGCCA  
CATCGCCGCAACTGCCGCGCCCCCGCAAGAGGGCTGTGGAAGTCCGGCAAGGAGGCCACACAGATGAAGGACTGCACCGAGCGCCAGG  
CCAACTTCCCTGGCAAGATCTGGCCCTCCACAAAGGGCGCCCCCGCAACTTCTGCACTCCCGCCCGAGCCACCGCCCCCGCCGAG  
TCCTTCCGCTTCGAGGAGACCAACCCCGCCCCCAAGCAGGAGGCCCTGACCTCCCTGAAGTCCCTGTTCGGCTCCGA  
CCCCCTGTCCCGAGTAA

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Fig. 69A

## 10. 2003 CON D gag. PEP

MGARASVL<sup>1</sup>SGGKLD<sup>2</sup>DAWEKIRLRPGGKKKRYLRKHIVWASRELERFALNPGLLETSEGGCKQII<sup>3</sup>QQLQPAIQ<sup>4</sup>TGSEELRSLYNTVATLYCVHERI  
 EVKDTKEALEKIEEEQNKS<sup>5</sup>KKKAQQAADTGNSSQVSONYPIVQNLQGMVHQAIS<sup>6</sup>PRTLNAWVKVIEEKAFSPEVIFMSALS<sup>7</sup>EGATPQDL  
 NTMLNTVGGHQAAMQMLKETINEEAAEWDR<sup>8</sup>LHPVHAGVPAPGOMREPRGSDIAGT<sup>9</sup>TSTLOEQIGWMTSNPPIPVGEIYKRWIILGLNKIVRM  
 YSPVILDIRQPKPEFRDYVDRFYKTLRAEQASQDVKNWMTETLLVQNANPDCKTILKALGPEATLEEMMTACQGVGGP<sup>10</sup>SHKARVLAEAMS  
 QATNSAAMV<sup>11</sup>MQRGNFKGPRKIIKCFNCGKEGHIAKNCRAPRKKGCKWCKGKEGHQMKDCTERQANFLGKIWP<sup>12</sup>SHKGRPGN<sup>13</sup>FLQSRPEPTAPPA  
 ESFGFEEITPSQKQEQDKELYPLTSLKSLF<sup>14</sup>GN<sup>15</sup>DPLSQS

Fig. 69B

## 2003 CON D gag. OPT

ATGG<sup>1</sup>CGCCCGCGCCTCCGTGTGTCCGGCGGCAAGCTGGACGCTGGGAGAAGATCCGCCCTGCGCCCGCGGGCGGCAAGAAGTACCGCCT  
 GAAGCACATCGTGTGGCCTCCCGGAGCTGGAGCGCTTCGCCCTGAACCCCGGCTGTCTGGAGACCTCCGAGGGCTGCAAGCAGATCATCG  
 GCCAGCTGACCCCGCCATCCAGACCGGCTCCGAGGAGCTGCGCTCCCTGTACAACACCCGTGGCCACCCCTGTACTGCGTGCACGAGCGCATC  
 GAGGTGAAGGACACCAAGGAGGCCCTGGAGAAGATCGAGGAGGAGCAGAACAGTCCAAGAAGAAGGCCACGAGGCCCGCCCGGACACCGG  
 CAACTCCTCCAGGTGTCCAGAACTACCCCATCGTGCAGAACCTGCAGSGCCAGATGGTGCACCAAGGCCATCTCCCCCGCACCTGAAACG  
 CCTGGTGAAGGTGATCGAGGAGAAGGCCCTTCTCCCCGAGGTGATCCCCATGTTCTCCGCCCTGTCCGAGGGCGCCACCCCGAGGACCTG  
 AACACCATGCTGAACACCGTGGCGGCCACCAAGCCCGCATGCAGATGCTGAAGGAGACCATCAACGAGGAGGCCCGCGAGTGGGACCGCCT  
 GCACCCCGTGACCGCGGCCCGTGGCCCCCGCCAGATGCGCGAGCCCCCGGGCTCCGACATCGCCGGCACCACTCCACCTGCAGGAGC  
 AGATCGGCTGGATGACCTCCAAACCCCGTGGCGGAGATCTACAAGCGTGGATCATCTGGGCTGAACAAGATCGTGCGCATG  
 TACTCCCCGTGTCCATCCTGGACATCCGCCAGGGCCCCAAGGAGCCCTTCCGCGACTACGTGGACCGCTTCTACAAGACCCCTGCGCGCGGA  
 GCAGGCTCCAGGACGTGAAGAACTGGATGACCGAGACCCCTGCTGGTGAGAACGCCAACCCGACTGCAAGACCATCTGAAGGCCCTGG  
 GCGCGAGGCCACCTGGAGGAGATGATGACCGCTGCCAGGGCTGGGGGCCCTCCCAAGGCCCGCGTGTGCGCGAGGCCATGTCC  
 CAGGCCACCAACTCCGCCCGCTGATGATGACGCGGCAACTCAAGGGCCCCCGCAAGATCATCAAGTGTCTCAACTGCGGCAAGGAGG  
 CCACATCGCCAAAGAACTGCCGCGCCCCCGCAAGAGGCTGCTGGAAGTGCGGCAAGGAGGCCACCCAGATGAAGGACTGCACCGAGCGCC  
 AGGCCAACTTCTGGGCAAGATCTGGCCCTCCCAAGGGCGCCCCGGCAACTCTCTGAGTCCCGCCGAGCCACCGCCCCCGCC  
 GAGTCTTGGCTTGGCGAGGAGATCACCCCTCCCAAGAGCAGGAGCAGAAGGACAAAGGAGCTGTACCCCTGACCTCCCTGAAGTCCCT  
 GTTCGGCAACGACCCCTGTCCAGTAA

Fig. 70A

## 11. 2003 CON F gag. PEP

MGARASVL<sup>SGKL</sup>DAWEKIRLRPGGKKYRMKHLVWASRELERFALDPGLLETSEGCQKIIGQLQPSLQTGSEELRSLYNTVAVLYCVHQKV  
 EVKDTKEALEKLEEEQNKSQKTQAAADKGVSONYPIVQNLQGMVHOAISPTILNAWKVIEEKAFSPVIMPFSALSEGATPQDLNTML  
 NTVGGHQAA<sup>MQML</sup>KD<sup>TINEEAAEWDRLHPVHAGPIPPQGMREPRGSDIAGTTSTLQEQIOWMTSNPPVPVGDYIKRWIILGLNKIVRMYSVPV</sup>  
 SILDIRQGPKEPFRDYVDRFEKTLRAEQATQEVKGMWTDLLVQANPDC<sup>KTILKALGPGATLEEMMTACQGVGGPGHKARVLAEAMSQATN</sup>  
 TAIMMQSNFKGQRRIVKFCNCGKEGHI<sup>AKNCRAPRKKGCKGREGHOMKDC</sup>TERQANFLGKIWPSNKG<sup>RPNFLQSRPEPTAPPAESFGF</sup>  
 REEITSPKQEQKDEGLYPPLASLSLFGNDP\$

Fig. 70B

## 2003 CON F gag. OPT

ATGGGCGCC<sup>CGGCCT</sup>CCGTGCTGCCGGGGCAAGCTGGACGCCCTGGGAGAAGATCCGCCCTGCGCCCCGGCGGCAAGAAGTACCGCAT  
 GAAGCACCTGGTGGGCTCCCGAGCTGGAGCGCTTCGCCCTGGACCCCGGCTGCTGGAGACCTCCGAGGGCTGCCAGAAGATCATCG  
 GCCAGCTGCAGCCCTCCCTGCAGACCGGCTCCGAGGAGCTGCGCTCCCTGTACAACACCGTGGCCGTGTACTGCGGTGCACCAAGAGTG  
 GAGGTGAAGGACACCAAGGAGGCCCTGGAGAAGCTGGAGGAGGAGCAGAACAAGTCCACAGAGAAGACCCAGAGGCCGCCGACAAAGG  
 CGTGTC<sup>CCAGAACTACCCCATCGTG</sup>CAGAACCTGCAGGCCAGATGGTGACACAGGCCATCTCCCCCGCACCCCTGAACGCTGGGTGAAGG  
 TGATCAGGAGAAGGCTTCTCCCGAGGTGATCCCCATGTTCTCCGCCCTGTCCGAGGGGCCACCCCGCAGGACCTGAACACCATGCTG  
 AACACCGTGGCGGCCACCAAGCCGCGCATGCAGATGCTGAAGGACACCATCAACGAGGAGGCCCGCGAGTGGACCGCTGCACCCCGTGCA  
 CGCCGCCCATCCCCCGGCGAGATGCGGAGCCCCCGGCTCCGACATCGCCGGCACCACTCCACCTGCAGGAGCAGATCCAGTGA  
 TGACCTCCAACCCCCCGTGGCGACATCTACAAGCGCTGGATCATCTCGGCCCTGAACAAGATCGTGGCATGTACTCCCCCGTG  
 TCCATCTGGACATCCGCCAGGCCCCAAGAGCCCTTCCCGACTACGTGGACCGCTTCTTCAAGACCTGCGCGCCGAGCAGGCCACCCA  
 GGAGGTGAAGGGTGGATGACCGCATGCCGACACCCCTGCTGGTGCAAGACGCCAACCCCGACTGCAAGCATCTGAAGCCCTGGGCCCGGCGCA  
 CCTGGAGGAGATGATACCGCTGCCAGGGCGTGGCGGCCCGGCCACAAAGCCCGCTGTGGCCGAGGCCATGTCCAGGCCACCAAC  
 ACCGCCATCATGATGCAGAA<sup>GTCCAACTTCAAGGGCCAGCCCGCATCGTGAAGTGTCAACTGCGGCAAGGAGGCCACATCGCCCAAGAA</sup>  
 CTGCCGCGCCCCCGCAAGAGGGCTGCTGGAAGTGGCGCGGAGGGCCACCAAGATGAAGGACTGCACCGAGCGCCAGGCCACTTCTCTG  
 GCAAGATCTGGCCCTCCAACAAGGGCGCCCCGCAACTTCTGTGAGTCCCGCCCCGAGCCACCGCCCCCGCGAGTCTTCTGGCTTC  
 CGCGAGGAGATCACCCCTCCCCCAAGCAGGAGCAGAGGCGCTGTACCCCCCTGGCCTCCCTGAAGTCCCTGTTCGGCAACGA  
 CCCCTAA

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Fig. 71A

## 12. 2003 CON G gag.PEP

MGARASVLGGKLDWEKIRLRPGGKKYRMKHLVWASRELERFALNPDLLETAEGCQOIMGQLQPALQTGTEELRSLFNTVATLYCVHQRI  
 EVKDTKEALEEVEKIQKKSQKTQQAAMDEGNSSQVSNYPVQNAQGMVHQAI SPRTLNAWVKVVEEKAFSPEVIPMFSAISEGATPQDL  
 NTMLNTVGGHQAAAMQMLKDTINEEAAEWD RMHPQQAAGPIPPGQIREPRGSDIAGTTSTLQEQIRWMTSNPPIPVGEIYKRWII LGLNKIVRM  
 YSPVSILDIRQGPKEPFRDYVDRFFKTLRAEQATQEVKGMWTDLLVQNA NPDKTILRALPGATLEEMMTACQGVGGPSHKARVLAEAMS  
 QASGAAAAMMOKSNFKGPRRTIKFCNCGKEGHLARNCRAPRKKGCWKCKEGHQMKDCTERQANFLGKIWPSNKGPRPGNLFQNRPEPTAPP  
 AESFGFGEETAPSPKQEQEKEKELYPLASLSLFGSDP\$

Fig. 71B

## 2003 CON G gag.OPT

ATGGGCGCCGCGCCTCCGTGTGTCCGGCGGCAAGCTGGACGCCCTGGGAGAAGATCCGCCCTGCGCCCGGGCGGCAAGAAGTACCGCAT  
 GAAGCACCTGTGTGGCCTCCCGAGCTGGAGCGCTTCGCCCTGAACCCCGACCTGTGGAGACCGCCGAGGGCTGCCAGAGATCATGG  
 GCCAGCTGCAGCCCGCCTGCAGACCGGCACCGAGGAGCTGCGCTCCCTGTTCAACACCGTGGCCACCCCTGTACTGCGTGCAACGCGCATC  
 GAGGTGAAGGACACCAAGGAGGCCCTGGAGGAGGTGAGAAGATCCAGAAGAAGTCCAGCAGAAGACCCAGCAGGCCGCCCATGGACGAGGG  
 CAACTCCTCCAGGTGTCCAGAACTACCCCATCTGTCAGAACGCCAGGGCCAGATGTCACACAGGCCATCTCCCCCGCACCCCTGAACG  
 CCTGGGTGAAGTGTGGAGGAGAAGSCCTTCTCCCCGAGGTGATCCCCATGTTCTCCGCCCTGTCCGAGGGCGCCACCCCGCAGGACCTG  
 AACACCATGCTGAACACCGTGGCGGCCACCCAGGCCCATGTCAGATGCTGAAGGACACCATCAACGAGGAGGCCGCCGAGTGGGACCCGCAT  
 GCACCCCGAGAGCGGCCCATCCCCCGGCCAGATCCGCGAGCCCCCGGGCTCCGACATCGCCGGCACCATCTCCACCCCTGCAGGAGC  
 AGATCCGCTGGATGACCTCCAACCCCCCATCCCGTGGCGGAGATCTACAAGCGCTGGATCATCTGGGCCCTGAACAAGATCGTGGCGCATG  
 TACTCCCCGTGTCCATCTTGACATCCGCCAGGGCCCAAGGAGCCCTTCCGCGACTACGTGGACCCGCTTCTCAAGACCCCTGCGCGCCGA  
 GCAGGCCACCCAGGAGGTGAAGGCTGGATGACCGACACCCCTGCTGGTGCAGAACGCCAACCCCGACTGCAGACCATCTGCGCGCCCTGG  
 GCCCGCGCCACCCCTGGAGGAGATGATGACCGCTGCCAGGGCGTGGCGGCCCTCCACAAGGCCCGCTGCTGGCCGAGGCCATGTCC  
 CAGGCTCCGCGCGCCCGCCCATCATGATGCAGAAGTCCAACTTCAAGGGCCCCCGCCGACCATCAAGTGTCTCAACTGCGGCAAGGA  
 GGGCCACCTGGCCCGCAACTGCCGCGCCCCCGCAAGAGGGCTGCTGGAAGTGGGCAAGGAGGCCACAGATGAAGACTGCACCGAGC  
 GCCAGGCCAACTTCTGGGCAAGATCTGGCCCTCCAAACAAGGGCGCCCGGCAACTTCTGTGAGAACCGCCCGAGCCACCGCCCCCCC  
 GCCGAGTCTTCCGCTTCCGCGAGGAGATCGCCCCCTCCCAAGCAGGAGCAGAGGAGTGTACCCCTGGCCTCCCTGAAGTC  
 CCTGTTCCGGCTCCGACCCCTAA

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Fig. 72A

## 13. 2003 CON H gag .PEP

MGARASVLSGGKLDWEKIRLRPGGKKYRLKHLVWASRELERFALNPGLLETAEGCLQIEQLQPAIKTGTTELQSLFNTVAVLYCVHQRI  
 DVKDTKEALGKIEIQNKSQKTQQAADKEKDNKVSQNYPIVQNAQGMVHQAISPRILNANVKVVEEKAFSPEVIPMFSALSEGATPQDL  
 NAMLNTVGGHQAAMQMLKDTINEEAAEWDRLHPVHAGPIPPGQMPREPRGSDIAGTTSTLQEQIAWMTGNPPIPVGDIYKRWIILGLNKIVRM  
 YSPVSLDIKQGPKEPFRDYVDRFFKTLRAEQATQDVKNWMTDTLLVQANPDKTILRALQOGASIEEMMTACQGVGGPSHKARVLAEAMS  
 QVTNANAAIMMQGNFKGPRKIVKCFNCGKEGHIARNCRAPRKKGCWKCGREGHQMKDCTERQANFLGKIWPSSKGRPGNLFQSRPEPTAPP  
 AESFGFGEEMTPSPKQELKDEPPLASLRSLFGNDPLS\$

Fig. 72B

## 2003 CON H gag .OPT

ATGGCGCCCGCGCCTCCGTGCTGTCCGGCGGCAAGCTGGACGCCCTGGGAGAAGATCCGCCCTCGGCCCGGGCAAGAAGTACCGCCT  
 GAAGCACCTGGTGTGGCCTCCGCGAGCTGGAGCGCTTCGCCCTGAACCCGGCCTGCTGGAGACCGCGAGGGCTGCTGCAGATCATCG  
 AGCAGCTGACGCCGCCATCAAGACCGGACCGAGGAGCTGCAGTCCCTGTTCAACACCGTGGCCGTGCTGTACTGCGTGCAACGCGCATC  
 GACGTGAAGGACACCAAGGAGGCCCTGGGCAAGATCGAGGAGATCCAGAAACAAGTCCAGAGAAGACCCAGCAGGCCGCCGACAAGGA  
 GAAGGACAAACAAGGTGTCCAGAACTACCCCATCGTGCAGAACGCCAGGCCAGATGTCACCCAGGCCATCTCCCCCGCACCCCTGAACG  
 CCTGGGTGAAGTGGTGGAGGAGAAGGCCCTTCTCCCCGAGGTGATCCCATGTTCTCCGCCCTGTCCGAGGGCGCCACCCCGCAGGACCTG  
 AACGCCATGCTGAACACCGTGGCGGCCACAGGCCGCCATGCAGATGCTGAAGGACACCATCAACGAGGAGGCCCGCGAGTGGGACCGCCT  
 GCACCCGTGCACGCCGCCCATCCCCCGGCCAGATGCGGAGCCCCCGGCTCCGACATCGCCGGCACCACTCCACCCCTGCAGGAGC  
 AGATCGCCTGGATGACCGGCAACCCCCCATCCCCGTGGCGACATCTACAAGCGCTGGATCATCTGGGCCCTGAACAAGATCGTGCGCATG  
 TACTCCCCCGTGTCCATCCTGGACATCAAGCAGGGCCCCAAGAGGCCCTTCCGCGACTACGTGGACCGCTTCTTCAAGACCTGCGGCGCCGA  
 GCAGGCCACCCAGGACGTGAAGAACTGGATACCGACACCTGCTGGTGCAGAACGCCAACCCCGACTGCAAGACCATCTGCGGCGCCTGG  
 GCCAGGGCGCCTCCATCGAGGAGATGATGACCGCTGCCAGGGCGTGGCGGCCCTCCACAAAGGCCCGCGTGTGCGGAGGCCATGTCC  
 CAGGTGACCAACGCCCAACGCCCATCATGATGCAGAAGGCAACTTCAAGGGCCCCCGCAAGATCGTGAAGTCTTCAACTGCGGCAAGGA  
 GGGCCACATCGCCCGCAACTGCCCGCCCCCGCAAGAGGCTGCTGGAAGTGGCGCCCGGAGGGCCACCAAGATGAAGACTGCACCGAGC  
 GCCAGGCCAACTTCTGGGCAAGATCTGGCCCTCTTCCAAAGGGCGGCCCGGCAACTTCTGTGAGTCCCGCCGAGCCACCGCCCCCCC  
 GCCGAGTCTTCCGCTTCGGCGAGGAGATGACCCCTCTCCCCCAAGCAGGAGCTGAAGGACAAAGGAGCCCCCTGGCCTCCCTGCGCTCCCT  
 GTTCGGCAACGACCCCTGTCTCCAGTAA

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Fig. 73A

## 14. 2003 CON K gag . PEP

MGARASVLSGGKLDTWKIRLRPGGKKYRLKHLVWASRELERFALNPSSLLETTEGCRQIIIRQLQPSLQTGSEELKSLFNTVATLYCVHQRI  
 EVRDTKEALDKLEEEQNKSOQKTQOETADKGVSONYPIVQNLQGMVHQALSPRTLNWVKVIEEKAFSPVIMFSAISEGATPQDLNMTL  
 NTVGGHQAAOMQLKDTINEEAAEWDRLHPVHAGPIPPGQMRPRGSDIAGTTSTLQEQITWMTSNPPVPVGEIYKRWIILGLNKIVRMYSVP  
 SILDIRQGEKPEFRDYVDRFFKTLRAEQATQEVKNWMTDLLVQANPDCKTILKALGPASLEEMTACQGVGGPGHKARILAEAMSQVTN  
 TAVMMQRGNFEKGQRKIICFNCGKEGHIARNCRAPRKKGCWKCKGKEGHQMKDCTERQANFLGKIWPSNKGKRPGNFLOSRPEPTAPAESFGE  
 GEEITPSRQETKDKEQGPPLTSLKSLFGNDPLSQ\$

Fig. 73B

## 2003 CON K gag . OPT

ATGGCGCCCGCGCCTCCGTGTGTCCGGCGGCAAGCTGGACACCTGGGAGAAGATCCGCCTGCGCCCCGGCGGCAAGAAGTACCGCCT  
 GAAGCACCTGGTGTGGCCTCCCGGAGCTGGAGCGCTTCGCCCTGAACCCCTCCCTGCTGGAGACCACCGAGGGCTGCCGCCAGATCATCC  
 GCCAGCTGCAGCCCTCCCTGCAGACCGGCTCCGAGGAGCTGAAGTCCCTGTTCAACACCCGTGGCCACCCCTGTACTGCGTGCACCCAGCGCATC  
 GAGGTGCGCGACACCAAGGAGGCCCTGGACAAAGCTGGAGGAGGAGCAGAACAAGTCCAGCAGAAAGACCCAGAGGAGACCGCCGACAAAGG  
 CGTGTCCAGAACTACCCCATCGTGCAGAACCTGCAGGGCCAGATGGTGACACCGCCCTGTCCCCCGCACCCCTGAACGCCCTGGGTGAAGG  
 TGATCGAGGAGAAGGCCCTTCTCCCCGAGGTGATCCCCATGTTCTCCGCCCTGTCCGAGGGCGCCACCCCCAGGACCTGAACACCATGCTG  
 AACACCGTGGCGGCCACCGGCCATGCAGATGCTGAAGGACACCATCAACGAGGAGCGCCGAGTGGACCGCTGCACCCCGTGCA  
 CGCCGGCCCCATCCCCCGGCCAGATGCGCGAGCCCCCGGGTCCGACATCGCCGSCACCACTCCACCCCTGCAGGAGCAGATCACCTGGA  
 TGACCTCAAACCCCGTCCCTGGCGGAGATCTACAAGCGCTGGATCATCTGGGCCCTGAACAAGATCGTGCGCATGTACTCCCCCGTG  
 TCCATCCTGGACATCCGCCAGGGCCCCAAGGAGCCCTTCCGCGACTACGTGGACCGCTTCTCAAGACCCCTGCGCGCCGAGCAGGCCACCCA  
 GGAGGTGAAGAACTGGATGACCGACACCCCTGTGGTGCAGAACGCCAACCCCGACTGCAAGACCATCCTGAAGGCCCTGGGCCCGCGCCT  
 CCTGGAGGAGATGATGACCGCTGCCAGGGCTGGCGGCCCGGCCACAGGCCCGCATCTGGCCGAGGCCCATGTCCCAGGTGACCAAC  
 ACCGCCGTGATGATGACGCGGCAACTTCAAGGGCCAGCGCAAGATCATCAAGTCTTCACTGCGGCAAGGAGGCCACATCGCCCCGCAA  
 CTGCCGCGCCCCCGCAAGAGGGCTGTGGAAGTGGGCAAGGAGGCCACCCAGATGAAGACTGCACCGAGCGCCAGGCCAACTTCTGG  
 GCAAGATCTGGCCCTCCAACAAGGGCCGCCCGGCAACTTCTGCAGTCCCGCCCCGAGCCACCGCCCCCGCGGAGTCCCTTCGGCTTC  
 GCGAGGAGATCACCCCTCCCCCGCCAGGAGACCAAGGACAAGGAGCGGCCCGCCCCCTGACCTCCCTGAAGTCCCTGTTCGGCAACGA  
 CCCCCCTGTCCCCAGTAA

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Fig. 74A

15. 2003 CON 01 AE gag. PEP  
 MGARASVLGGKLDWEEKIRLRPGGKKYRMKHLVWASRELERFALNPGLLETAEGCQIIIEQLQSTLKTGSEELKSLFNTVATLWCVHQRI  
 EVKDTKEALDKIEEVQNKSQKTQAAAGTSSSKVSQNYPIVQNAQGMVHQPLSPRTLNAWVKVVEEKGFNPEVIPMFSALSEGATPQDL  
 NMMLNIVGGHQAAQMMLKETINEEAAEWDRVHPVHAGPIPPGQMREPRGSDIAGTSTLQEQIGWMTNNPPIPVGDIYKRWIIILGLNKKIVRM  
 YSPVILDIRQPKPEFRDYVDRFYKTLRAEQATQEVKNWMTETILLVQANPDCKSILKALGTGATLEEMMTACQGVGGPSHKARVLAEMS  
 QAOHANIMMQRGNFKQKRIKCFNCGKEGHLARNCRAPRKKGCKGKEGHQMKDCTERQANFLGKIWPSNKGPRGNFPQSRPEPTAPPAEN  
 WGMGEIITSLPKQEQDKHEHPPPLVLSLKFNDPLSQ\$

Fig. 74B

2003 CON 01 AE gag. OPT  
 ATGGCGCGCGCCTCCGTGCTGTCCGGGGCAAGCTGGACGCCCTGGGAGAAGATCCGCCCTGGCCCCCGCGGCAAGAAGTACCGCAT  
 GAAGCACCTGGTGTGGGCTCCCGAGCTGGAGCGCTTCGCCCTGAACCCGGCTGTGGAGACCGCCGAGGCTGCCAGCAGATCATCG  
 AGCAGCTGCAGTCCACCTGAAGACCGGCTCCGAGGAGCTGAAGTCCCTGTTCAACACCGTGGCCACCCTGTGGTGCGTGCAACAGCGCATC  
 GAGGTGAAGGACACCAAGGAGGCCCTGGACAAGATCGAGGAGGTGCAAGAACAGTCCAGAGAACCCAGAGGCGCGCGCCGCGCACCGG  
 CTCCTCCTCCAAAGGTGCCAGAACTACCCATCGTGCAGAACGCCAGGGCCAGATGGTGCAACAGCCCTGTCCCCCGCACCTGAAACG  
 CCTGGGTGAAGTGTGGAGGAGAAGGCTTCAACCCGAGGTGATCCCATGTCTCCGCCCTGTCCGAGGCGCCACCCCGAGGACCTG  
 AACATGATGCTGAACATCGTGGCGGCCACAGCGCGCCATGCAGATGCTGAAGGAGACCATCAACGAGGAGGCGCGGAGTGGGACCGCGT  
 GCACCCGTGCACGCGGCCCCATCCCCCGGCGAGATGCGCGGACATCTACAAGCGCTGGATCATGCTGGGCTGAACAAGATCGTGCGCATG  
 AGATCGGCTGGATGACCAACAACCCCCCATCCCCGTGGGCGACATCTACAAGCGCTGGATCATGCTGGGCTGAACAAGATCGTGCGCATG  
 TACTCCCCGTGTCATCTGGACATCCGCCAGGGCCCCAAGGAGCCCTTCCGGGACTACGTGGACCGCTTCTACAAGACCCCTGCGCGCGGA  
 GCAGGCCACCCAGGAGGTGAAGAACTGGATGACCGAGACCTGTGTGTCAGAACGCCAACCCGACTGCAAGTCCATCCTGAAGGCCCTGG  
 GCACCGGCGCCACCTGGAGGAGATGATGACCGCTGCCAGGCGTGGGCGGCCCTCCACAGGCCCGCGTGTGGCCGAGGCCATGTCC  
 CAGGCCAGCACGCCAACATCATGATGCAGCGCGGCAACTTCAAGGGCCAGAACCGCATCAAGTGCTTCACTCGGCAAGGAGGCCACCT  
 GGCCCGCAACTGCCGCGCCCCCGCAAGAGGGCTGCTGGAAGTCCGGCAAGGAGGCCACCCAGATGAAGGACTGCAACGAGCGCCAGGCCA  
 ACTTCTGGGCAAGATCTGGCCCTCCAAAGGGCGGCCCCGCAACTTCCCCAGTCCCCCGGAGCCACCGCCCCCGCCGAGAAC  
 TGGGGCATGGGCGAGGATCACCTCCCTGCCCAAGCAGGAGCAGAGGACACCCCCCCCCCTGGTGTCCCTGAAGTCCCTGTT  
 CGGCAACGACCCCTGTCCAGTAA

Fig. 75A

## 16. 2003 CON 02 AG gag. PEP

MGARASVLGGKLD~~AW~~EKIRLRPGKKKYLKHLVWASRELERFALNPGLLETAEGCCQIMEQLQSALRTGSEELKSLYNTVATLWCVHQRI  
 DIKDTKEALDKIEEVQNSKQKTQAAATGSSSQNPYIVQNAQOMTHQSMSPRTLNAWKVIEEKAFSPEVIPMFSALSEGATPQDLNMM  
 LNI~~V~~G~~H~~Q~~AA~~AMQMLKDTINEEAAEWD~~R~~VPVHAGPIPPGOMREPRGSDIAGTSTLQEOIGWMTSNPPIPVGEIYKRWIVLGLNKIVRMYS  
 VSILDIRQPKPEFRDYVDRFFKTLRAEQ~~AT~~QEVKNWMTETLLVQ~~AN~~PDCKSILRALPGATLEEMMTACQGVGGPGHKARVLAEAMSQVQ  
 QSNIMQ~~R~~GNFRGQRTIKCFNCGKEGHLARNCKAPRKKGCKGKEGHQMKDCTERQANFLGKIWPSSKGRPNFPQSRPEPTAPPAESFGM  
 GEEITSSPKQEP~~R~~DKGLYPPLTSLKSLFGNDP\$

Fig. 75B

## 2003 CON 02 AG gag.OPT

ATGGCGC~~CG~~CGCCTCCGTGCTGCCGGGCAAGCTGGACGCTGGGAGAAAGATCCGCTCGCCCGCCGCGGCAAGAAGTACCGCCT  
 GAAGCACCTGGTGTGGCCCTCCCGGAGCTGGAGCGCTTCGCCCTGAACCCCGGCTGTGGAGACCGCGAGGGCTGCCAGCAGATCATGG  
 AGCAGCTGCAGTCCGCCCTGCGCACCGGCTCCGAGGAGCTGAAGTCCCTGTACAACACCGTGGCCACCCCTGTGGTGCCTGCACGCGCATC  
 GACATCAAGGACACCAAGGAGGCCCTGGACAAGATCGAGGAGGTGCAGAACAAAGTCCAAGCAGAAAGACCCAGCAGGCCCGCCGCCACCCGG  
 CTCCTCCTCCAGAACTACCCCATCGTGCAGAACGCCAGGCCAGATGACCCACCACTCCATGTCCCCCGCACCCCTGAACGCCCTGGGTGA  
 AGGTGATCGAGGAGAAGCCTTCTCCCGAGGTGATCCCCATGTTCTCGCCCTGTCCGAGGGGCCACCCCCCAGGACCTGAACATGATG  
 CTGAACATCGTGGCGGCCACAGGCCCGCATGCAGATGCTGAAGGACACCATCAACGAGAGGCCCGCCAGTGGACCCGCTGCACCCCGT  
 GCACGCCGCCCATCCCCCGGCCAGATGCGCGAGCCCCCGGCTCCGACATCGCCGGGACCACTCCACCTGCAGGACAGATCGGCT  
 GGATGACCTCCAACCCCCCATCCCCGTGGCGAGATCTACAAGCGCTGGATCGTGTGGCCCTGAACAAGATCGTGGCATGTACTCCCC  
 GTGTCCATCTGGACATCCGCCAGGGCCCAAGAGCCCTTCCGGCACTACGTGGACCGCTTCTTCAAGACCTGCGCGCCGAGCAGGCCAC  
 CCAGGAGGTGAAGAACTGGATACCGGACCCCTGCTGGTGCAGAACGCCAACCCCGACTGCAAGTCCATCTGCGGCCCTGGGCCCGGCG  
 CCACCTGGAGGAGATGATACCGCCTGCCAGGGCGTGGCGGCCCAAGGCCCGCTGTGGCCGAGGCCATGTCCAGGTGCAG  
 CAGTCCAACATCATGATGCAGCGCGCAACTTCCGCGGCCAGCGACCATCAAGTCTTCACTGCGGCAAGGAGGCCACCTGGCCCGCAA  
 CTGCAAGGCCCCCGCAAGAGGGCTGCTGGAAGTGGGCAAGGAGGCCACCAAGATGAAGACTGCACGAGCGCCAGGCAACTTCCTGG  
 GCAAGATCTGCCCTCCTCAAGGGCCGCCCGGCAACTTCCCCAGTCCCCCGGACCCAGCCACCGGCCCTGACCTCCCTGAAGTCCCTGTTCGGCAACGA  
 GCGGAGGAGATCACCTCTCCCCCAAGCAGGAGCCCCGGCAAGGGCCTGTACCCCCCTGACCTCCCTGAAGTCCCTGTTCGGCAACGA  
 CCCCTAA

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Fig. 76A

## 17. 2003 CON 03 ABG gag . PEP

MGARASVLGGKLDÄWEKIRLRPGGKKYRIKHLVWASRELERFALNPSSLLETSEGQQIILEQLQPTLKTGSEELKSLYNTVATLYCVHORI  
 EIKDTKEALDKIEEI QNKSQKTQQAATGTSSSKVSQNYPIVQNAQGMTHQMSPTLNAWKVIEEKAFSEVIMFSALESEGATPQDL  
 NMMLNIVGGHQAAMQMLKDTINEEAAEWDRLHPAQAGFPFGOMREPRGSDIAGTTSTLQEQIGWMTSNPPIPVGDIYKRWIILGLNKIVRM  
 YSPVSIIDIRQPKPEFRDYVDRFFKTLRAEQATQDVKNWMTETLLVQANPDCKTILRALGSGATLEEMMTACQGVGGPGHKARVLAEAMS  
 QVQANIMMQKSNFRGPKRIKFCNCGKDGHLARNCRAPRKKGCWKCKEGHQMCKDCTERQANFLGRINWPSSKGRPGNFPQSRPEPSAPPAEN  
 FGMGEEITPSLKQEQKDREQHPPSISLKSLFGNDPLSQ\$

Fig. 76B

## 2003 CON 03 ABG gag . OPT

ATGGCGC<sup>~</sup>CGG<sup>~</sup>CGCCTCCGTGCTGCCGGGCAAGCTGGACGCCCTGGGAGAAGATCCGCCCTGCGCCCGGGGCAAGAAGTACCGCAT  
 CAAGCACCTGGTGTGGCCTCCCGGAGCTGGAGCGCTTCGCCCTGAACCCCTCCCTGCTGGAGACCTCCGAGGGCTGCCAGCAGATCCTGG  
 AGCAGCTGAGCCCACTGAAGACCGGCTCCGAGGAGCTGAAGTCCCTGTACAACACCGTGGCCACCTGTACTGCGTGCAACGAGCGCATC  
 GAGATCAAGGACACCAAGGAGCCCTGGACAAGATCGAGGAGATCCAGAACAAGTCCAAGCAGAAGACCCAGCAGGCCGCCACCCGGCACCCGG  
 CTCCTCCTCCAAGGTGTCCCAGAACTACCCCATCGTGAGAACGCCAGGGCCAGATGACCCACCATGTCCTCCGCCCTGTCCGAGGGCGCCACCCCGCAGCCTGAACG  
 CCTGGGTGAAGGTGATCGAGGAGAAGGCTTCTCCCGAGGTGATCCCATGTTCTCCGCCCTGTCCGAGGGCGCCACCCCGCAGGACCTG  
 AACATGATGCTGAACATCGTGGGCGGCCACAGGCCCATGAGATGCTGAGGACACCATCAACGAGGAGGCCGCGGAGTGGGACCGCCT  
 GCACCCCGCCAGGCGGCCCTTCCCGCCGCGAGATGCGCGGACATCAAGCGCTGGATCATCCTGGGCCTGAACAAGATCGTGCGCATG  
 AGATCGGCTGGATGACCTCAACCCCGCATCCCGTGGCGACATCAAGCGCTGGATCATCCTGGGCCTGAACAAGATCGTGCGCATG  
 TACTCCCGCTGTCATCCTGGACATCCGCCAGGCCCAAGGAGCCCTTCCGCGACTACGTGGACCGCTTCTTCAAGACCTGCGCGCCGA  
 GCAGGCCACCCAGGACGTGAAGAACTGGATGACCGAGACCCCTGCTGTGTCAGAACGCCAACCCCGACTGCAAGACCATCCTGCGCGCCCTGG  
 GCTCCGGCGCCACCTGGAGGAGATGATGACCGCCTGCCAGGGCTGGGCGGCCCGGCCCAAGGCCCGCTGTGGCCGAGGCCATGTCC  
 CAGGTGCAGAACGCCAACATCATGATGCAGAACTCAACTTCCGCGGCCCAAGCGCATCAAGTGTTCACCTGCGGCAAGGACGGCCACCT  
 GCGCCGCAACTGCGCGGCCCGCCGCAAGAGGGCTGCTGGAAGTGCGGCAAGGAGGCCACCATGATGAAGGACTGCACCGAGCGCCAGGCCA  
 ACTTCTGGGCGCATCTGGCCCTCCTCCAAGGGCGGCCCGGCAACTTCCCCAGTCCGCGCCGAGCCCTCCGCCCCCGCCGAGAAC  
 TTCGGCATGGGCGGAGGATCACCCCTCCCTGAAGCAGGAGCAGAACCGCGAGCACCCCCCTCCCATCTCCCTGAAGTCCCTGTT  
 CGGCAACGACCCCTGTCCAGTAA

Fig. 77A

18. 2003 CON 04 CFX gag .PEP  
 MGARASVLGGKLDÄWERIRLRPGKKYRLKHLVWASRELERFALNPGLLETAEGCQQLMEQLQSTLKTGSEELKSLENTIATLWCVHQRI  
 DVKDTKEALDKVEEMQNSKQKTQAAADTGGSSNVSNQYPIVQNAQGMVHQSI SPRTLNWVKVIEEKAFSPVIEPMFSALSEGATPQDL  
 NMMLNIVGGHQAAMQLKDTINEEAAEWDRAPVHAGPIPPGQMRPRGSDIAGTTSTLQEQIGWMTSNPPIPVGEIYKRWIILGLNKIVRM  
 YSPVSILDIRQGPKEPRFDYVDRFFKCLRAEQATQEVKNWMTETLLVQANPDCKSILKALGTGATLEEMMTACQGVGGPSHKARVLAEAMS  
 QASNAAAAIMMQSNFKGQRRRIKCFNCGKEGHLARNCRAPRKKGCWKCGKEGHQMKDCTERQANFLGRMWPSSKGRPNGLQSRPEPTAPP  
 AESLEMKEETSSPKQEPDRDKELYPLTSLKSLFGSDPLSQS

Fig. 77B

2003 CON 04 CFX gag .OPT  
 ATGGCGCCCGCGCCCTCCGTGCTGTCCGGCGGCAAGCTGGACGCCCTGGAGCGCATCCGCCCTCGCCCCGGCGCAAGAAGTACCGCCT  
 GAAGCACCTGGTGTGGCCCTCCCGGAGCTGGAGCGCTTCGCCCTGAACCCCGGCTGTGGAGACCGCCGAGGGCTGCCAGCAGCTGATGG  
 AGCAGCTGCAGTCCACCTGAAGACCGGCTCCGAGGAGCTGAAGTCCCTGTTCACACCATCGCCACCTGTGTGTGCGTGCCAGCGCATC  
 GACGTGAAGGACACCAAGGAGGCCCTGGACAAAGTGGAGGAGATGCAGAACAAAGTCCAGAGCAAGACCCAGAGGCCCGCCGACACCCGG  
 CGGCTCCTCCAACGTGTCCAGAACTACCCCATCGTGCAGAACGCCAGGCCAGATGGTGCACCATCTCCCGGCGCCACCCCGACCCCTGAACG  
 CCTGGGTGAAGGTGATCGAGGAGAAGCCCTTCCTCCCGAGGTGATCCCATGTTCCTCGCCCTGTCCGAGGGCGCCACCCCGCAGGACCTG  
 AACATGATGCTGAACATCGTGGCGGCCACAGGCCGCGCATGCAGATGCTGAAGGACACCATCAACGAGGAGGCCCGGAGTGGACCCGCG  
 CCACCCGTGCACGCGGCCCATCCCGGCCAGATGCGGAGCCCCCGGCTCCGACATCGCCGCGCACCATCTCCACCTGCAGGAGC  
 AGATCGGTGGATGACCTCAACCCCGTGGCGAGATCTACAGCGCTGGATCATCTGGGCTGAACAAGATCGTGGCGCATG  
 TACTCCCGGTCCATCCTGGACATCCGCCAGGCCCTTCGCGACTACGTGGACCGCTTCTTCAAGTGCCTGCGCGCCGA  
 GCAGGCCACCCAGGAGGTGAAGAACTGGATGACCGAGACCCCTGTGTCAGAACGCCAACCCGACTGCAAGTCCATCTGAAGGCCCTGG  
 GCACCGCGCCACCTGGAGGAGATGATGACCGCTGCCAGGCGGTGGCGGCCCTCCACACAGGCCCGCTGTGGCCGAGGCCATGTCC  
 CAGGCTCCAAACGCGCGCCGCTCATGATGCAGAACTCCAACTCAAGGCCAGCGCCGCTCATCAAGTCTTCACTGCGGCAAGGA  
 GGGCCACCTGGCCCGCACTGCGCGCCCCCGCAAGAGGCTGCTGGAAGTGGCGCAAGGAGGCCACCATGATGAAGGACTGCACCGAGC  
 GCCAGGCCAACTTCTGGGCGCATGTGGCCCTCCTCCAAAGGCGCGCCCGGCAACTTCTGCAAGTCCGCGCCGAGCCACCGCCCCCCC  
 GCCGAGTCCCTGGAGATGAAGGAGGAGACCACTCCTCCCCCAAGCAGGAGCCCCCGGCAAGGAGCTGTACCCCTGACCTCCCTGAAGTC  
 CCTGTGCGCTCCGACCCCTGTCCCCAGTAA

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Fig. 78A

19. 2003 CON 06 CPX gag . pep  
 MGARASVLGGKLDWEKIRLRPGKKYRLKHLVWASRELERFALNPGLLETAEGCQOIIEQLQSALKTGSEELKSLYNTVATLYCVHORI  
 KVTDTKEALDKIEIQNKSKQKAQAAATGNSSNLSONYPIVQNAQGMVHQAI SPRTLNWVKVIEEKAFSPVIPMFSAISEGATPQDL  
 NMLNIVGGHQAAMQLKDTINEEAAEWDVRVHPVHAGPIPPQOMREPRGSDIAGTTSTLQEQIGWMTSNPPIPVGEIYKRWIILGLNKIVRM  
 YSPVSILDIRQGPKEPERFDYVDRFFKTLRAEQATQEVKNWMTDTLLVQANPDCCKTILKALPGATLEEMMTACQGVGGPGHKARVLAEAMS  
 QASGTEAAIMMQSNFKPGPKRSIKCFNCGKEGHLARNCRAPRKKGCKGKEGHOMKDCTERQANFLGKIWPSNKGPRPGNLFQNRPEPTAPP  
 AESFGFEETAPSPKQEPKEKELYPLASLKSIFGNDP\$

Fig. 78B

2003 CON 06 CPX gag . opt  
 ATGGGCGCCGCGCCTCGTGTCCGGCGGCAAGCTGGACGAGTGGGAGAAAGATCCGCCCTGGCCCCGGCGGCAAGAAAGTACCGCCT  
 GAAGCACCTGTTGTGGCCTCCCGGAGCTGGAGCGCTTCGCCCTGAACCCCGGCTGTGGAGACCGCGAGGGCTGCCAGCAGATCATCG  
 AGCAGTGCAGTCCGCCCTGAAGACCGGCTCCGAGGAGCTGAAGTCCCTGTACAAACCCGTGGCCACCCCTGTACTGCGTGACACGAGCGCATC  
 AAGGTGACCGACACCAAGGAGGCCCTGGACAAGATCGAGGAGATCCAGAACAAAGTCCAAGAGAGGCCAGCAGGGCCGCCGCCACCCGG  
 CAACTCCTCCAACCTGTCCAGAACTACCCCATCGTGCAGAACGCCAGGGCCAGATGGTGACACAGGCCATCTCCCCGACCCCTGAACG  
 CCTGGTGAAGGTGATCGAGGAGAAGCCCTTCCTCCCGAGGTGATCCCATGTTCTCCGCCCTGTCCGAGGGCGCCACCCCGCAGGACCTG  
 AACATGATGCTGAACATCGTGGCGGCCACAGGCCCATCGAGATGCTGAAGGACACCATCAACGAGGAGGCCGCGAGTGGACCCGCT  
 GCACCCCGTGACGCCGCCCATCCCCCGGCCAGATGCGCGAGCCCCGCGCTCCGACATCGCCGACCATCGCCGACCATCCACCTGCAGGAGC  
 AGATCGGCTGGATGACCTCCAAACCCCCCATCCCCGTGGCGAGATCTACAAGCGCTGGATCATCTGGGCCCTGAACAGATCGTGCGCATG  
 TACTCCCCGTGTCATCCTGGACATCCGCCAGGGCCCCAAGGAGCCCTTCGCGACTACGTGGACCGCTTCTTCAAGACCTGCCGCCCGA  
 GCAGGCCACCCAGGAGTGAAGAACTGGATGACCGACACCCCTGTGTCAGAACGCCAACCCCGACTGCAAGACCATCCTGAAGGCCCTGG  
 GCCCGCGCCACCCCTGGAGGAGATGATGACCGCTGCCAGGCGTGGCGGCCCGGCCACAAAGGCCCGCTGCTGGCCGAGGCCATGTCC  
 CAGGCCCTCCGGCACCGAGCGCCCATCATGATGCAGAGTCCAACTCAAGGCCCCCAAGCGTCCATCAAGTCTCAACTGCGGCAAGGA  
 GGGCCACCTGGCCGCAACTGCCCGCCCCCGCAAGAAGGCTGCTGGAAGTGGGCAAGGAGGCCACACAGATGAAGGACTGCAACCGAGC  
 GCCAGGCCAACTTCCCTGGCAAGATCTGGCCCTCCAAACAAGGCCCGCCGCAACTTCTGCAGAACCGCCCGAGCCACCGCCCCCCC  
 GCCGAGTCCTTCGGCTTCGGCGAGGAGACCGCCCCCTCCCCCAAGCAGGAGCCCCAAGGAGAGTGTACCCCCCTGGCCTCCCTGAAGTC  
 CCTGTTCGGCAACGACCCCTAA

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Fig. 79A

## 20. 2003 CON 07 BC gag . PEP

MGARASILRGGLDKWEKIRLRPGGKKHYMLKHLVWASRELERFALNPGLLETSEGCKQIIKQLPALQTGTTEELRSLFNTVATLYCVHTEI  
 DVDRDTEALDKIEEEQNKIQOKTQQAKEADGKVSQNYPIVQNLOGQMVHQPISPRTLNAWKVVEEKAFSPEVIPMFSAISEGATPQDINTM  
 LNTVGGHQAAMQIILKDTINEEAAEWDRLHPVHAGPIAPGQMPREPRGSDIAGTTSNLQEQIAMTSPNPVPVGDIIYKRWIILGINKIVRMYSP  
 TSILDIKQGPKEPFRDYVDRFFKTLRAEQATQDVKNWMTDTLLVQNANPDCKTILRALPGASIEEMMTACQGVGSPSHKARVLAEAMSQTN  
 STILMQRSNFKGSKRIVKFCNCGKEGHIARNCRAPRKKGCKGKEGHQMKDCTERQANFLGKIWP SHKGRPNFLQSRPEPTAPPEESFRE  
 GEETTPSQKEPIDKELYPLTSLKSLFGNDPSSQ\$

Fig. 79B

## 2003 CON 07 BC gag . OPT

ATGGCGCGCGGCGCTCCATCCTGCGCGCGGCAAGCTGGACAAGTGGGAGAAGATCCGCCCTGCGCCCCGGCGGCAAGAAGCACTACATGCT  
 GAAGCACCTGGTGTGGGCTCCCGCGAGCTGGAGCGCTTCGCCCTGAACCCCGGCTGTGGAGACCTCCGAGGGCTGCAAGCAGATCATCA  
 AGAGCTGAGCCCGCTGAGACCGGACCGGAGAGTGGCTCCCTGTTCAACACCGTGGCCACCCCTGTACTGCGTGCACACCGAGATC  
 GACGTGCGGACACCAAGGAGCCCTGGACAAGATCGAGGAGGAGCAGAACAGATCCAGCAGAAGACCCAGCAGGCCAAGGAGGCCGACGG  
 CAAGGTGTCCAGAACTACCCCATCGTGCAAGAACCTGCGAGGCCAGATGGTGACCCATCTCCCCCGCACCCCTGAACGCCCTGGGTGA  
 AGGTGTGGAGGAGAAGCCCTTCTCCCCGAGGTGATCCCATGTTCTCGCCCTGTCCGAGGGCGCCACCCCGCAGACCTGAACGCCCTGGGTGA  
 CTGAACACCGTGGCGGCCACAGGCCCGCATGCAGATCCTGAAGGACACCATCAACGAGGAGCGCGGAGTGGGACCGCTGCACCCCGT  
 GCACCGCGGCCCATCGCCCGCATGCGCGAGCCCGCGGCTCCGACATCGCCGGCACCATCCAACTGCAGGAGCAGATCGCCT  
 GGATGACCTCCAAACCCCGTGGCGGACATCTAAAGCGCTGGATCATCCTGGGCTGAACAAGATCGTGCATGTACTCCCC  
 ACCTCCATCCTGGACATCAAGCAGGCCCCCAAGAGCCCTTCGCGACTACGTGGACCGCTTCTTCAAGACCTTCGCGCCGAGCAGGCCAC  
 CCAGGACGTGAAGAACTGGATGACCGACACCTGTGTGAGAAACGCCAACCCTGCTGAGACCATCTGCGCGCCCTGGGCCCCGGCG  
 CCTCCATCGAGGAGATGATGACCGCTGCGAGGCGTGGCGGCCCTCCACAAAGGCCGCTGTGCTGCGGAGGCCATGTCCAGACCAAC  
 TCCACCATCCTGATGACGCTCCAACTTCAAGGCTCCAAAGCGCATCGTGAAGTCTTCAACTGCGGCAAGGAGGCCACATCGCCCCGCA  
 CTGCCGCGCCCCGCAAGAGGCTGCTGGAAGTGGGCAAGGAGGCCACCATGAGGACTGCAACGAGGCCAGGCCAACTTCCTGG  
 GCAAGATCTGGCCCTCCACAAAGGCCGCTGCTGCAAGTCCCGCCCGAGCCACCGCCCCCGGAGGAGTCTTCCGCTTC  
 GCGGAGGAGACCAACCCCTTCCAGAAAGCAGGAGCCCATCGACAAGGAGCTGTACCCCTGACCTCCCTGAAGTCCCTGTTCGGCAACGA  
 CCCCCTCCTCCAGTAA

Fig. 80A

## 21. 2003 CON 08 BC gag .PEP

MGARASILRGKLDKWEKIRLRPGGKKHYMLKHLVWASRELERFALNPGLLETSEGCKQIIKQLPALQGTGTEELRSLFNTVATLYCVHAEI  
 EVRDTKEALDKIEEQNKIQKTOQAKEADEKVSQNYPIVQNLQGMVHQPLSPRTILNWKVVEEKAFSPEVIMFTALSEGATPODLNTM  
 LNTVGGHQAAQMMLKDTINEEAAEWDRILHPVHAGPVAPGOMREPRGSDIAGTSTLQEQIGWMTNNPPIPVGEIYKRWIILGLNKIVRMYS  
 TSILDIKQGPKEPFRDYVDRFFKTLRAEQATQDVKNWMTDILLVQANPDKTILRALGPGASLEEMMTACQGVGGPSHKARVLAEAMSQTN  
 NTILMQRSNFKSKRIVKCFNCGKEGHIANKRCRAPRKKGWCKGKEGHQMKDCTERQANFLGKIWP SHKGRPNFLQSRPEPTAPPAESFRF  
 EETTPAPKQEPKDREPLTSLRSLFGSDPLSQS

Fig. 80B

## 2003 CON 08 BC gag .OPT

ATGGCGCGCGCGCTCCATCCTGCGCGCGCGCAAGCTGGACAAGTGGGAGAAGATCCGCTGCGCGCGCGGGAAGACACTACATGCT  
 GAAGCACCTGGTGTGGCCCTCCCGGAGCTGGAGCGCTTGCCTGAACCCGGCTGTGGAGACCTCGAGGGCTGCAAGCAGATCATCA  
 AGCAGCTGCAGCCCGCTGCAGACCGGACCGAGGAGCTGCGTCCCTGTTCACACCGTGGCCACCTGTACTGCGTGACGCCGAGATC  
 GAGTGGCGGACACCAAGGAGGCCCTGGACAAAGATCGAGGAGGAGAGCAAGATCCAGCAGAAGACCCAGCAGGCCAAGGAGGCCGACGA  
 GAAGGTGTCCAGAACTACCCATCGTGCAGAACCTGCAAGGCCAGATGTTGACACCGCTGTCCGAGGGCGCACCCCGAGGACCTGAACCCATG  
 AGGTGGTGGAGGAGAAGGCTTCTCCCGAGGTGATCCCATGTTACCGCCCTGTCCGAGGGCGCACCCCGAGGACCTGAACCCATG  
 CTGAACACCGTGGCGGCCACCAAGCGCCATGCAGATGCTGAAGGACACCATCAACGAGGAGGCCCGGAGTGGGACCGCTGCACCCCGT  
 GCACGCCGCGTGGCCCGCGGAGATGCGCGAGCCCGCGGCTCCGACATCGCCGGCACCACTCCACCTGCAGGAGCAGATCGGCT  
 GGATGACCAACAACCCCATCCCGTGGCGAGATCTACAAGCGCTGGATCATCTGGGCTGAACAAGATCGTGGCATGTACTCCCC  
 ACCTCCATCCTGGACATCAAGCAGGGCCCAAGGAGCCCTTCCGCGACTACGTGGACCGCTTCTTCAAGACCTTCCGCGCCGAGCAGGCCAC  
 CCAGGACGTGAAGAACTGGATGACCGACACCTGTGTGAGAACGCCAACCCCGACTGCAAGACCATCTTGGCGGCCCTGGGCCCGCGG  
 CCTCCCTGGAGGAGATGATGACCGCTGCCAGGGCTGGCGGCCCTCCCAACAAGGCCCGCTGTGGCCGAGGCCATGTCCAGACCAAC  
 AACACCATCCTGATGCAGCGCTCCAACTTCAAGGGCTCCAAGCGCATCGTGAAGTCTCAACTGGGCAAGGAGGCCACATCGCCAAGAA  
 CTGCCGCGCCCCCGCAAGAAGGCTGTGGAAGTGGGCAAGGAGGCCACCAAGATGAAGACTGCAAGGCGCAGGCCAACTTCCCTGG  
 GCAAGATCTGGCCCTCCCAACAAGGGCGCCCTGCTGAGTCCCGCCCGAGCCCAAGCGCCCGCCCGCGGAGTCTTCCGCTTC  
 GAGGAGACCAACCCCGCCCCCAAGCAGGAGCCCAAGGAGCGGAGCCCTGACCTCCCTGCGCTTCCGCTCCGAGCCCGCTGTCCCA  
 GTAA

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Fig. 81A

## 22.. 2003 CON 10 CD gag .PEP

MGARASVLGGKLEWEKIRLRPGGKKYRLKHLVWASRELERFALNPGLLETSEGCKQIIGQLQPAIQTGSEEEKSLYNTVATLYCVHERI  
 KVTDTKEALDKIEEEQTKSKKKAQQAATADTGNSSQVSQNPYIVQNLQGMVHQP LSPRTLNAWKVIEEKAFSPEVIPMFSALSEGATPQDL  
 NTMLNTVGGHQAAQMQLKETINEEAAEWDR LHPVQAGPVAPGQIREPRGSDIAGTTSTLQEQIRWMTSNPPIPVGEIYKRWIIILGLNKIVRM  
 YSPVSILDIRQGPKEPRFDYVDRFYKTLRAEQASQDVKNWMTETLLVQANANPDCKTILKALGPAATLEEMMTACQGVGGPSHKARVLAEAMS  
 QATSGNAIMMQRGNFKGPKKI IKCFNCKEGHIAKNCRAPRKKKGCKWCKGREGHQMKDCTEROANFLGKIWP SNKGRPNFLQSRPEPTAPPA  
 ESFGFGEIITPSQKQEQDKELHPLIASLKSFLGNDPLSQ\$

Fig. 81B

## 2003 CON 10 CD gag .OPT

ATGGCGCCCGCGCCTCCGTGCTGTCCGGGGCAAGCTGGACGAGTGGAGAGATCCGCTGCGCCCGGGGCAAGAAGTACCGCCT  
 GAAGCACCTGGTGTGGCCTCCCGGAGCTGGAGCGCTTCGCCCTGAACCCCGGCTGTGGAGACCTCCGAGGGCTGCAAGCAGATCATCG  
 GCCAGCTGCAGCCCGCATCCAGACCGGCTCCGAGGAGATCAAGTCCCTGTACAACACCTGTGGCCACCTGTACTGCGTGACGAGCGCATC  
 AAGTGACCGACACCAAGGAGGCCCTGGACAAGATCGAGGAGGACAGACCAAGTCCAAGAAGAAGGCCAGCAGGCCACCCGCGACACCCG  
 CAATCCTCCAGGTGTCCAGAACTACCCCATCGTGCAAGAACCTGCAGGGCCAGATGGTGACCAAGCCCTGTCCCCCGCACCCCTGAACG  
 CCTGGTGAAGTGATCGAGGAGAAGGCCTTCTCCCCGAGGTGATCCCCATGTTCTCCGCCCTGTCCGAGGGCGCCACCCCGAGACCTG  
 AACACCATGCTGAACACCGTGGCGGCCACACGCGCCCATGCAGATGCTGAAGGAGACCATCAACGAGGAGGCCCGGAGTGGGACCGCCT  
 GCACCCGTGCAGCGCGGCCCGTGGCCCGCCAGATCCCGGCCAGATCCCGGAGCCCGGCTCCGACATCGCCGCGCACCACTCCACCTGCAGGAGC  
 AGATCCGCTGGATGACCTCAACCCCGCCATCCCGTGGCGGAGATCTACAAGCGTGGATCATCTGGGCCCTGAACAAGATCGTGCGCATG  
 TACTCCCCGTGTCCATCCTGGACATCCGCCAGGGCCCCAAGGAGCCCTTCCGCGACTACGTGGACCCGTTCTACAAGACCATCTGAAGGCCCTGG  
 GCAGGCTCCAGGACGTGAAGAACTGGATGACCGGCTGGCGGCGTGGCGGCCCTCCACAAGGCCCGCGTGTGGCCGAGGCCATGTCC  
 CAGGCCACCTCCGGCAACGCCATCATGATGACGCGCGCAACTTCAAGGGCCCCCAAGAAGATCATCAAGTGCTTCAACTGCGGCAAGGAGGG  
 CCACATCGCCAAAGAACTCCCGGCCCGCCCGCAAGAGGCTGTGGAAGTGGCGCGCGAGGGCCACCAAGATGAAGGACTGCACCGAGCGCC  
 AGGCCAACTTCTTGGCAAGATCTGGCCCTCCACAAGGGCGGCCCGGCAACTTCTGCAGTCCGCGCCCGAGCCCAACCGCCCCCGCC  
 GAGTCCCTTCGGCTTCGGCGAGGAGATCACCCCTCCAGAGCAGGAGCAGAGGACTGCACCCCTGGCCTCCCTGAAGTCCCT  
 GTTCGGCAACGACCCCTGTCCAGTAA

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Fig. 82A

23. 2003\_CON\_11\_CPX\_gag.PEP  
 gag.PEPMGARASVLSGGKLDAAWEKIRLRPGKKKRYRLKHLVWASRELERFALNPSSLLETAEGCQIQIMQLOPALGTGTEELRSLYNTVATL  
 YCVHHRIEVKDTKEALDKIEEIQNKSKQKKQQAADTGNSSKVSQNYPIVQNAQGMVHQAISPTLNWVKVVEEKAFSPVIMFSAISE  
 GATPQDLNMLNIVGGHQAAQMMLKDTINEEAAEWDRVHPVHAGPIPPQMREPRGSDIAGTTSTLQEQIGWMTGNPPVPVGEIYRRWIIIG  
 LNKIVRMYSPVSIIDIRQGPKEPFDRDYVDRFFKTLRAEQATQEVKSWMETLLIQANPDCKSILRALPGATLEEMMTACQGVGGPGHKAR  
 VLAEMSQVQQTNIMMORSNFKGQKRIKCFNCGKEGHLARNCRAPKKGCKWCKEGHQMKDCTERQANFLGKIWPSSKGRPGNFLQSRPEP  
 TAPPAESFGFGEIEIAPSPKQEPKEKELYPLTSLKSLFGSDPLSQ\$

Fig. 82B

2003\_CON\_11\_CPX\_gag.OPT  
 ATGGCGC<sup>CG</sup>CGCCTCCGTGTCCGGCGGCAAGCTGGACGCGCTGGGAGAAAGATCCGCCCTGCGCCCCGGCGGCAAGAAGTACCGCCT  
 GAAGCACTGGTGTGGCCTCCCGGAGCTGGAGCGCTTCGCCCTGAACCCCTCCCTGCTGGAGACCGCGAGGGCTGCCAGCATCATGG  
 GCCAGTGCAGCCCGCCTGGCACCGGACCGGAGCTCGCTCCCTGTACAACACCGTGGCCACCCCTGTACTCGGTGCACCAACCGCATC  
 GAGGTGAAGGACACCAAGGAGGCCCTGGACAAGATCGAGGAGATCCAGAACAAGTCCAAGACAAGAGCAGCAGGCCGCCGCCGACACCGG  
 CAACTCCTCCAAGGTGCCAGAACTACCCCATCGTGCAAGACGCCAGGCCAGATGGTGCACCAAGGCCATCTCCCCCGCACCCCTGAACG  
 CCTGGGTGAAGGTGGTGAGGAGAAGCCTTCTCCCCGAGGTGATCCCCATGTTCTCGCCCTGTCCGAGGGCGCCACCCCGCAGGACCTG  
 AACATGATGCTGAACATCGTGGCGGCCACCAAGGCCCATGCAGATGCTGAAGGACACCATCAACGAGGAGCGCGGAGTGGGACCGCGT  
 GCACCCGTGCACGCCGCCCATCCCCCGCAGATGCGCGAGCCCCCGGCTCCGACATCGCCGGCACCATCCACCTCCACCTGCAGGAGC  
 AGATCGGCTGGATGACCGGCAACCCCCGTGCCCCGTGGCGAGATCTACCGCGCTGGATCATCCTGGGCTGAACAAGATCGTGGCGCATG  
 TACTCCCCGTGTCATCCTGGACATCCGCCAGGGCCCCAAGAGCCCTTCCCGGACTACGTGGACCGCTTCTTCAAGACCTGCGCGCCGA  
 GCAGGCCACCCAGAGGTGAATCCTGGATGACCGAGACCCCTGTGATCCAGAACGCCAACCCGACTGCAAGTCCATCTGCGCGCCCTGG  
 GCGCGCGCCACCCCTGGAGGAGATGATGACCGCCTGCCAGGCGTGGCGGCCCCCGGCCACAAGGCCCGCTGTGGCCGAGGCCATGTCC  
 CAGGTGCAGCAGACCAACATCATGATGCAGCGTCCAACTTCAAGGGCCAGAAGCGCATCAAGTGTCTCACTGCGGCAAGGAGGCCACCT  
 GCGCCGCAACTGCCGCGCCCCCGCAAGAGGCTGCTGGAAGTGGGCAAGGAGGCCACCATGAAGGACTGCACCGAGCGCCAGGCCA  
 ACTTCTGGGCAAGATCTGGCCCTCTCCAAAGGCGGCCCGGCAACTTCTGAGTCCGCCCCGAGCCACCGCCCCCGCGGAGTCC  
 TTCGGCTTCGGCGAGGAGATCGCCCCCTCCCCCAAGCAGGAGGCCCAAGGAGTGTACCCCCCTGACCTCCCTGAAGTCCCTGTTCGG  
 CTCGACCCCCCTGTCCCCAGTAA

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Fig. 83A

24. 2003 CON 12 BF.gag.PEP  
 MGARASVLGGELDRWEKIRLRPGKKKYLKHIWASRELERFAVNPGLLETSEGRKIIIGQLPSLQOTGSEELRSLYNTIAVLYFVHQKV  
 EVKDTKEALDKLEEEQNKSOQKTQAAADKGVSONYPIVQNLQGMVHOALSPTLNWVKVVEEKAFSPEVIMFSALSEGATPQDLNMTL  
 NTVGCHQAAQMMLKDTINEEAAEDRLHPVHAGPIPPGOMREPRGSDIAGTSTLQEQIQWMTSNPPVPVGEIYKRWIILGLNKIVRMYSVP  
 SILDIRQPKPEFRDYVDREFFKTLRAEQATQEVKGWMTDTLLVQANANPDCKTILKALPGATLEEMMTACQVGGPGHKARVLAEAMSQVTN  
 TTVMQKSNFKQRRIRIVKFCNCGKEGHIKNCRAPRKKGCKGREGHQMKDCTERQANFLGKIWPSNKGPRGNFLQNRPEPTAPPAESFGE  
 GEEITPSPKQEQKDEGLYPPLASLSLFGNDP\$

Fig. 83B

2003 CON 12 BF.gag.OPT  
 ATGGCGCCCGCGCCTCCGTGCTCCGGCGCGGAGCTGGACCGCTGGGAGAGAGATCCGCCCTGCGCCCGCGGCGGCAAGAAAGTACCGCCT  
 GAAGCACATCGTGTGGCCTCCCGGAGCTGGAGCGCTTCGCCGTGAACCCCGGCTGTGGAGACCTCCGAGGGCTGCCGCAAGATCATCG  
 GCCAGCTGAGCCCTCCCTGCAGACCCGGCTCCGAGGAGCTGCGTCCCTGTACAACACCATCGCCGTGCTGTACTTCGTGCACCAAGAGGTG  
 GAGTGAAGGACACCAAGGAGGCCCTGGACAAGCTGGAGGAGGAGCAGAACAGTCCCAGCAGAGACCCAGCAGGCCCGCCGACACAAGG  
 CGTGTCCAGAACTACCCATCGTGCAGAACCTGCAGGGCCAGATGGTGCACAGGCCCTGTCCCCCGCACCTTGAAACGCTGGGTGAAGG  
 TGGTGGAGGAGAGGCTTCTCCCCGAGGTGATCCCCATGTTCTCCGCCCTGTCCGAGGGCGCACCCCGCAGGACCTGAACCATGCTG  
 AACACCGTGGCGGCGCACCGCCATGCAGATGCTGAAGGACACCATCAACGAGGAGGCCCGGAGTGGACCGCTGCACCCCGTGCA  
 CGCCGGCCCATCCCCCGCCAGATGCGCGAGCCCGCGGCTCCGACATCGCCGGCACCACTCCACCTGCAGGAGCAGATCCAGTGGA  
 TGACCTCCAACCCCGTGGCGGAGATCTACAAGCGCTGGATCATCCTGGGCTGAACAAGATCGTGGCATGTACTCCCCCGTG  
 TCCATCCTGGACATCCGCCAGGCGCCCAAGGAGCCCTCCGCGACTACGTGGACCGCTTCTCAAGACCCCTGGCGCCGAGCAGGCCACCCA  
 GGAGGTGAAGGGCTGGATGACCGCATCCGACACCTGCTGTGCAGAACGCCAACCAAGGCCCGCTGTGGCCGAGGCCATGTCCAGGTGACCAAC  
 CCTTGGAGGAGATGATGACCGCTGCCAGGGCGTGGCGGCGCCCGCCACAGGCCCGCTGTGGCCGAGGCCATGTCCAGGTGACCAAC  
 ACCACCGTGTGATGCAGAGTCCAACTCAAGGGCCAGCGCGCATCGTGAAGTCTTCACTCGGCAAGGAGGCCACATCGCCCAAGAA  
 CTGCGCGCCCCCGCAAGAAGGCTGCTGGAAGTGGCGCGCGAGGCCACCAAGATGAAGACTGCACCGAGCGCCAGGCCAACTTCCTGG  
 GCAAGATCTGGCCCTCCAACAAGGCGCGCCCGGCAACTTCTGCAGAACCGGCCCGAGCCACCGCCCCCGCGAGTCTTCGGCTTC  
 GCGGAGGAGATCACCCCCCTCCCCCAAGCAGGAGCAGAGGAGGGCCTGTACCCCCCTGGCCTCCCTGAAGTCCCTGTTGGCAACGA  
 CCCCCTAA

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Fig. 84A

25. 2003 CON 14 BG gag.pEP  
 MGARASVLSGGKLD~~AW~~EKIRLRPGGKKYRMKHLVWASRELERFALNPDLLETAEGCCQIMGQLQPALQTGTTEEIRSLFNTVATLYCVHQKI  
 EVKDTKEALEEVEKAQKKSQKQQAAMDEGNNSQASQNYPIVQNAQGMVHQAISPTILNAWVKVVEKA~~FS~~PEVIPMF~~S~~ALSEGATPQDLN  
 TMLNTVGGHQAAMQMLKDTINEEAAEWMRHPQAGPIPPGQIREPRGSDIAGTTSTLQEQIRWMTSNPPIPVGEIYKRWIILGLNKIVRMY  
 SPVSILDIRQPKPEFRDYVDRFFKTLRAEQATQEVKGWMTDTLLVQNPANPDCKTILRALPGATLEEMMTACQGVGSPSHKARVLAEAMSQ  
 ASGATIMMQKSNFKGPRRNKICFNCGKEGHLARNCRAPRKKGCKGKEGHQMKDCTESKANFLGKIWPNSNKGPRGNFLQNRPEPTAPPAES  
 FGFGEELAPSPKQEPKEKEIYPLASLKSFLGSDPSSQ\$

Fig. 84B

2003 CON 14 BG gag.OPT  
 ATGGCGC~~CG~~CGCTCCGTGCTGTCCGGCGGGCAAGCTGGACGCCCTGGGAGAAGATCCGCCCTGGCCCCGGGGCAAGAAAGTACCGCAT  
 GAAGCACCTGGTGTGGGCTCCCGGAGCTGGAGCGCTTCGCCCTGAACCCCGACCTGCTGGAGACCCGCGAGGGCTGCCAGCAGATCATGG  
 GCCAGCTGCAGCCCGCTGCAGACCGGCACCGAGGAGATCCGCTCCCTGTTCAACACCGTGGCCACCCCTGTACTGCGTGCACCAAGATC  
 GAGTGAAGGACACCAAGGAGGCCCTGGAGGAGGTGGAGAAGGCCCAAGAGTCCCAAGAGAAGCAGCAGGCCGCCCATGGACGAGGCA  
 CAACTCCAGGCTCCCAAGAACTACCCCATCGTGCAGAACGCCAAGGCCAGATGGTGCAACAGGCCATCTCCCCCGCACCCCTGAACGCT  
 GGTGAAGTGTGGAGGAGAAGGCTTCTCCCGAGGTGATCCCATGTTCTCCGCCCTGTCCGAGGGCGCCACCCCGAGGACCTGAAC  
 ACCATGCTGAACACCGTGGCGGCCACCAAGCGCCATGCAGATGCTGAAGGACACCATCAACGAGGAGGCCGCCGAGTGGGACCGCATGCA  
 CCCCAGCAGCGCGCCCATCCCCCGGCCAGATCCGCGAGCCCCCGGCTCCGACATCGCCGGACCACTCCACCTGCGCAGGAGCA  
 TCCGCTGGATGACCTCAACCCCCCATCCCCGTGGCGAGATCTACAAGCGCTGGATCATCTGGGCTGAACAAGATCGTGCGCATGTAC  
 TCCCCGTGTCCATCCTGGACATCCGCCAGSGCCCCAAGGAGCCCTTCCGCGACTACGTGGACCGCTTCTTCAAGACCTTGGCGCCGAGCA  
 GGCAACCAAGGAGTGAAGGCTGGATGACCGACACCCCTGCTGGTGCAGAACGCCAACCCGACTCAAGACCTTCAAGACCTTGGCGCCCTGGGCC  
 CCGCGCCACCTGGAGGAGATGATGACCGCTGCCAGGGCTGGCGGCCCTCCCAAGGCCCGCGTGTGGCCGAGGCCATGTCCCGAG  
 GCCTCCGGCGCCACCATCATGATGCAGAACTCAACTCAAGGGCCCCCGCGCAACATCAAGTGTCAACTGCGGCAAGGAGGCCACCT  
 GGCCCGCAACTCCCGGCCCCCGGAAAGGGCTGTGGAAGTGCAGGAGGAGGCCACCAAGATGAAGGACTGCACCGAGTCCAAGGCCA  
 ACTTCTGGGCAAGATCTGGCCCTCCAACAAGGGCCCCCGGCAACTCTTGCAGAACCGCCCCGAGCCACCGCCCCCTCCCGCGAGTCC  
 TTCGGCTTCGGCGAGGAGATCGCCCCCTTCCCCCAAGCAGGAGGAGATCTACCCCTTGGCCCTCCCTGAAGTCCCTGTTCGG  
 CTCGACCCCTAATCCCAGTAA

Fig. 85A

## 31. 2003 CONS nef.PEP

MGGKWSKSSIVGWPAVRERIRRTPPAAEGVAVSQDLDKHGAISSNTAATNADCAWLEAQEEEEVGFVPRQVPLRPMTYKGAFDLSHFLK  
 EKGGLDGLIYSKKRQEIILDLWVYHTQGYFPDWQNYTPGPGIRYPLTFGWCFLVPVDPEEVEEANEENNCILLHPMCQHGMEDEREVLMMK  
 FDSRLALRHIARELHPEFYKDC\$

Fig. 85B

## 2003 CONS nef.OPT

ATGGGCGGCAAGTGGTCCAAGTCTCCATCGTGGGTGGCCCGCGGTGCGGAGCGCATCCGGCCGACACCCCGCCCGGAGGGCGGTGGG  
 CGCCGTGTCCCAGGACCTGGACAAGCACGGGCCATCCTCTCCAACACCGCCGCCAACACGCCGACTGCGCTGGCTGGAGGCCCAGG  
 AGGAGGAGGAGTGGGCTTCCCCGTGCGCCCCCAGGTGCCCCCATGACCTACAGGGCGCCTTGGACCTGTCCACTTCCCTGAAG  
 GAGAGGGCGGCTGGACGGCTGATCTACTCAAGAAGCGCCAGGAGATCCTGGACCTGTGGGTGTACACACCCAGGGTACTTCCCCGA  
 CTGGCAGAACTACACCCCCGGCCCGGCATCCGCTACCCCTGACCTTCGGTGGTGTCAAGCTGGTGGCCGTGGACCCCGAGGAGGTGG  
 AGGAGGCCAACGAGGGCGAGAACAACTGCCTGTGCCAGCACCGCATGGAGGACGAGGACCGGAGGTGCTGATGTGGAAG  
 TTCGACTCCCGCTGGCCCTGGGCCACATCGCCCGGAGTGCACCCCGAGTTCTACAAGGACTGCTAA

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Fig. 86A

## 32. 2003 M. GROUP.anc nef.PEP

MGGKWSKSSIVGWPAVRERMRRTAPAAEGVAVSQDLDKHGAISSNTAATNADCAWLEAQEEEEVGFVPRQVPLRPMTYKAAFDLSHFLK  
 EKGGLDGLIYSKKRQEIILDLWVYHTQGYFPDWQNYTPGPGIRYPLTFGWCFLVPVDPEEVEEANEENNCILLHPMCQHGMEDEREVLMMK  
 FDSRLALRHIARELHPEFYKDC\$

Fig. 86B

## 2003 M GROUP.anc nef.OPT

ATGGGCGGCAAGTGGTCCAAGTCTCCATCGTGGGTGGCCCGCGGTGCGGAGCGCATGGGCCGACACCCCGCCCGGAGGGCGGTGGG  
 CGCCGTGTCCCAGGACCTGGACAAGCACGGGCCATCCTCTCCAACACCGCCGCCAACACGCCGACTGCGCTGGCTGGAGGCCCAGG  
 AGGAGGAGGAGTGGGCTTCCCCGTGCGCCCCCAGGTGCCCCCATGACCTACAGGGCGCCTTGGACCTGTCCACTTCCCTGAAG  
 GAGAGGGCGGCTGGACGGCTGATCTACTCAAGAAGCGCCAGGAGATCCTGGACCTGTGGGTGTACACACCCAGGGTACTTCCCCGA  
 CTGGCAGAACTACACCCCCGGCCCGGCATCCGCTACCCCTGACCTTCGGTGGTGTCAAGCTGGTGGCCGTGGACCCCGAGGAGGTGG  
 AGGAGGCCAACGAGGGCGAGAACAACTGCCTGTGCCAGCACCGCATGGAGGACGAGGAGCGGAGGTGCTGATGTGGAAG  
 TTCGACTCCCGCTGGCCCTGGGCCACATCGCCCGGAGTGCACCCCGAGTTCTACAAGGACTGCTAA

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Fig. 87A

## 33. 2003 CON A nef.PEP

MGGKWSKSSIVGWPDIRERIRRTPPAAKGVGAVSQDLDKYGAVTINNATAQASCWLEAQEEEEVEVFPVRPQVPLRPMTFKGAFDLSFFL  
KEKGLDGLIYSKRQEIILDLWVYHTQGYFPDWQNYTPGPGIRYPLTFGWCFLVPVDPDEVEKATEGENNSLLHPICQHGMDDEEKEVLMW  
KFDSRLARRHIALEHPEFYKDC\$

Fig. 87B

## 2003 CON A nef.OPT

ATGGCGGCAAGTGGTCCAAGTCCATCGTGGGTGGCCCGACATCCGCGAGCGCATCCGCGCACCCCGCCGCAAGGGCGTGGG  
CGCCGTGTCCCAGGACCTGGACAAGTACGGCGCGGTGACCATCAACAACACGCGCCACCCAGGCTCCTGCGCTGGCTGGAGGCCAAG  
AGGAGGAGGAGGTGGGTTCCTCGTGGCCCGCCAGGTGCCCTGCGCCCATGACCTCAAGGGCGCTTCGACCTGTCTTCTTCTG  
AAGGAGAAGGGCGCTGGACGGCTGATCTACTCCAGAGCGCCAGGAGATCCTGGACCTGTGGTGTACAACACCCAGGGCTACTTCCC  
CGACTGGCAGAACTACACCCCGGCCCGCCGCTTCCCTGACCTTCGGCTGGTGTCAAGTGGTGGCCGTGGACCCCGACGAGG  
TGGAGGAGGCCACCGAGGGCGAGAACACTGCTGTCACCCCATCTGCGAGCACGCGCATGGACGACGAGGAGGAGGTGCTGATGTGG  
AAGTTCGACTCCCGCTGGCCCGCCGACATCGCCCTGGAGATGCACCCCGAGTTCTACAAGGACTGCTAA

Fig. 88A

## 34. 2003 CON A1 nef.PEP

MGGKWSKSSIVGWPDIRERIRRTPPAAKGVGAVSQDLKHGAVTSSNINHPSCVWLEAQEEEEVEVFPVRPQVPLRPMTYKALDLSHFLKEK  
GGLDGLIYSKRQEIILDLWVYHTQGYFPDWQNYTPGPGIRYPLTFGWCFLVPVDPDEVEKATEGENNSLLHPICQHGMDDEEREVLKWKFD  
SRLALKHRAQELHPEFYKDC\$

Fig. 88B

## 2003 CON A1 nef.OPT

ATGGCGGCAAGTGGTCCAAGTCCATCGTGGGTGGCCCGAGGTGGCGGAGCGCATGCGCGCACCCCGCCGCAAGGGCGTGGG  
CGCCGTGTCCCAGGACCTGGACAAGCACGGCGCGGTGACCTCTCAACATCAACACCCCTCCTGCGTGGCTGGAGGCCAAGGAGG  
AGGAGTGGGTTCCTCGTGGCCCGCCAGGTGGCCCTGCGCCCATGACCTACAAGGGCGCTTCGACCTGTCCCACTTCTGAAGGAGAAG  
GGCGCCTGGACGGCTGATCTACTCCCGCAAGCGCCAGGAGATCCTGGACCTGTGGTGTACACACCCAGGGCTACTTCCCCGACTGGCA  
GAACTACACCCCGGCCCATCCGCTACCCCTGACCTTCGGCTGGTGTCAAGTGGTGGCCGTGGACCCCGACGAGGTGGAGAAG  
CCACCGAGGGGAGAACAACTCCCTGTGCACCCCATCTGCGAGCACGCGCATGGACGACGAGGAGCGCGAGGTGCTGAAGTGAAGTTCGAC  
TCCCGCCTGGCCCTGAAGCACCCGGCCGAGGAGTGCACCCGAGTTCTACAAGGACTGCTAA

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Fig. 88C

35. 2003 A1.anc nef. pep  
 MGKWSKSSIVGWPEVRERMRRTPPAAKGVGAVSQDLDKHGAVTSSNTAANNPGCAWLEAQEEEEVGFPVRPQVPLRPMITYKGAFDLSHFLK  
 EKGGLDGLIYSKKRQELDLWVYHTQGYFPDWQNYTPGPIRYPLTFGWCFKLVDPDAEVEEATEGENNSLLHPICQHGMDDEEREVLWVK  
 FDSRLALKHRARELHPEFYKDC\$

Fig. 88D

2003 A1.anc nef.OPT  
 ATGGGCGGCAAGTGGTCCAAGTCTCCATCGTGGGTGGCCGAGGTGGCGGAGCGCATGCGCCGACCCCGCCGCAAGGCGGTGGG  
 CGCCGTGTCCAGGACCTGGACAAGCAGCGCCGTGACCTCCTCCAACACCGCCGCCAACAAACCCGGCTGCGCCTGGCTGGAGGCCCAAG  
 AGGAGGAGGAGGTGGCTTCCCGTGGCGCCCGCCAGGTGCCCTGGCGCCCATGACCTACAAGGGCGCCTCGACCTGTCCACTTCTCTGAAG  
 GAGAAAGGCGGCTGGACGGCTGATCTACTCAAGAAGCGCCAGGAGATCCTGGACCTGTGGTGTACCAACACCCAGGGCTACTTCCCCGA  
 CTGGCAGAACTACACCCCGCCCGGCATCCGCTACCCCTGACCTTCGGTGGTGTCAAGCTGGTGGCGGACCCCGGAGGTGG  
 AGGAGGCCACCGAGGCGGAGAACAACTCCCTGCTGCACCCCATCTGCCAGACGACGAGGAGCGCGAGGTGCTGATGTGGAAG  
 TTGGACTCCCGCCTGGCCCTGAAGCACCGCGCCCGGAGCTGCACCCGAGTTCTACAAGGACTGCTAA

Fig. 89A

36. 2003 CON A2 nef. pep  
 MGKWSKSSIVGWPAIRERMRKRTPPAAEGVAVSQDLATRGAVTSSNTAATNPDCAWLEAQEEEEVGFPVRPQVPLRPMTFKGAFDLSHFL  
 KEKGLDGLIYSQKRQDILDLWVYHTQGYFPDWQNYTPGPIRYPLTFGWCFKLVDPDSEVEEATEGENNSLLHPICQHGIEDPEREVLRW  
 KFDSRLALRHRARELHPEFYKDC\$

Fig. 89B

2003 CON A2 nef.OPT  
 ATGGGCGGCAAGTGGTCCAAGTCTCCATCGTGGGTGGCCCGCCATCCGCGGAGCGCATGGCGAAGCGCACCCCGCCCGCGAGGCGGT  
 GGGCCCGTGTCCAGGACCTGGCCACCCGCGCGCGGTGACCTCCTCCAACACCGCCGCCAACCAACCCGACTGCGCCTGGCTGGAGGCCCC  
 AGGAGGAGGAGGAGGTGGCTTCCCGTGGCGCCCGCCAGGTGCCCTGGCGCCCATGACCTTCAAGGGCGCCTCGACCTGTCCACTTCTCTG  
 AAGAGAAGGCGGCGCTGGACGGCTGATCTACTCCAGAAAGCGCAGGACATCTGGACCTGTGGTGTGTFACCAACACCCAGGGCTACTTCCC  
 CGACTGGCAGAACTACACCCCGCCCGGCACCCGCTACCCCTGACCTTCGGTGGTGTCAAGCTGGTGGCGGACCCCGGAGGTGCTCCGAGG  
 TGAGAGGCCACCGAGGCGGAGAACAACTCCCTGCTGCACCCCATCTGCCAGACGGCATCGAGGACCCCGAGCGGAGGTGCTGGCGTGG  
 AAGTTCGACTCCCGCCTGGCCCTGGCGCACCGGGCCCGGAGCTGCACCCCGAGTTCTACAAGGACTGCTAA

Fig. 90A

37. 2003 CON B nef.PEP  
 MGKWSKRSVVGWPTVRRMRRAEPAADGVGAVSRDLEKHGAITSSNTAANNADCAWLEAQEEEEVGFVRPQVPLRPMTYKALDLSHFLK  
 EKGGLEGLIYSQKRQDILDWVYHTQGYFPDWQNYTPGPIRYPLTFGWCFKLVPEPEKVEEANEGENNSLLHPMSLHGMDDPEREVLVWK  
 FDSRLAFHHMARELHPEYKDC\$

Fig. 90B

2003 CON-B nef.OPT  
 ATGGGCGGCAAGTGGTCCAAGCGCTCCGTGGTGGGCTGGCCCAACCGTGCGGAGCGCATGCGCGCGGAGCCCGCGCGCGGTGGG  
 CGCCGTGTCCCGGACCTGGAGAAGCAGCGGCCATCACCTCTCAACACCGCCGCCAACAAACGCGGACTGCGCCTGGCTGGAGGCCCCAGG  
 AGGAGGAGGAGTGGCTTCCCGTGGCGCCCGCAGGTGCCCTGCGCCCATGACCTACAAGGCGCCCTGGACCTGTCCACTTCCCTGAAG  
 GAGAAGGCGGCGCTGGAGGCTGATCTACTCCAGAAGCGCAGGACATCCTGGACCTGTGGGTGTACCAACACCGAGGCTACTTCCCCGA  
 CTGGCAGAACTACACCCCGGCGCGCATCCGTAACCCCTGACCTTCGGTGGTCTCAAGCTGGTGGCGCGGAGCCCGAGAGGTGG  
 AGGAGGCCAACGAGGCGAGAACAACTCCCTGTGTCACCCCATGTCCCTGCACGGCATGGACGACCCCGAGCGGAGGTGCTGGTGTGGAAG  
 TTCGACTCCCGCTGGCCTTCCACCACATGGCCCGGAGCTGCACCCGAGTACTACAAGGACTGCTAA

Fig. 90C

38. 2003 B.anc nef.PEP  
 MGKWSKRSVVGWPAVRRMRRAEPAADGVGAVSRDLEKHGAITSSNTAATNADCAWLEAQEEEEVGFVRPQVPLRPMTYKAALDLSHFLK  
 EKGGLEGLIYSQKRQDILDWVYHTQGYFPDWQNYTPGPIRYPLTFGWCFKLVPEPEKVEEATEGENNSLLHPMCQHGMDDPEKEVLVWK  
 FDSRLAFHHMARELHPEYKDC\$

Fig. 90D

2003 B.anc nef.OPT  
 ATGGGCGGCAAGTGGTCCAAGTCCATGGGCGGCTGGCCCGCGCTGCGGAGCGCATGAAGCGCGGAGCCCGCGCGCGGTGGG  
 CGCCGTGTCCCGGACCTGGAGAAGCAGCGGCCATCACCTCTCAACACCGCCGCCAACAAACGCGGACTGCGCCTGGCTGGAGGCCCCAGG  
 AGGAGGAGGAGTGGCTTCCCGTGGCGCCCGCAGGTGCCCTGCGCCCATGACCTACAAGCGCGCCCTGGACCTGTCCACTTCCCTGAAG  
 GAGAAGGCGGCGCTGGAGGCTGATCTACTCCAGAAGCGCAGGACATCCTGGACCTGTGGGTGTACCAACACCGAGGCTACTTCCCCGA  
 CTGGCAGAACTACACCCCGGCGCGCATCCGTACCCCTGACCTTCGGTGGTGTCAAGCTGGTGGCGCGGAGCCCGAGAGGTGG  
 AGGAGGCCAACGAGGCGAGAACAACTCCCTGTGTCACCCCATGTGCCAGCACGCGCATGGACGACCCCGAGAGGAGGTGCTGGTGTGGAAG  
 TTCGACTCCCGCTGGCCTTCCACCACATGGCCCGGAGCTGCACCCGAGTACTACAAGGACTGCTAA

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Fig. 91A

39. 2003 CON 02 AG nef.PEP  
 MGKWSKSSIVGWP<sup>K</sup>VRIRIRQT<sup>P</sup>PAATGVGAASQDLDRHGAI<sup>T</sup>SSNTAATNADCAWLEAQEEEEVGFPVRPQVPLRPM<sup>T</sup>YKAAVDLSHFLK  
 EKGGLEGLIYSKKRQ<sup>E</sup>ILDLWVYHTQGF<sup>F</sup>PDWQNYTPGPGTRF<sup>L</sup>TFGWCFLVPM<sup>D</sup>PAEVEEANE<sup>G</sup>ENNSLLHPICQHGMEDEDEDREVLVWR  
 FDSSLA<sup>F</sup>KHRA<sup>R</sup>ELHPEFYKDC\$

Fig. 91B

2003 CON 02 AG nef.OPT  
 ATGGCGGCAAGTGGTCCAGTCTCCATCGTGGGTGGCCCAAGTGGCGAGGCGCATCCGCCAGACCCCCCGCGCCACCGCGGTGGG  
 CGCCGCTCCAGGACCTGGACCGCACGCGCATCACTCTCCAACACCGCCGACCAACGCCGACTGCGCTGGCTGGAGGCCCAGG  
 AGGAGGAGGAGTGGGCTTCCCGTGGCGCCCGAGGTGCCCTGACCTACAAAGGCGCGTGACCTGTCCCACTTCTCCTGAAG  
 GAGAAAGGCGGCTGGAGGCGCTGATCTACTCAAGAAAGCGCAGGAGATCCTGGACCTGTGGGTGTACCAACCCAGGGCTTCTTCCCGA  
 CTGGCAGAACTACACCCCGGCGCCCGGACCGCTTCCCGTGGCTTCAAGCTGTGCGCATGGACCCCGCGAGGTGG  
 AGGAGGCCAACGAGGCGGAGAACTCCCTGTGTGACACCCCATCTGCCAGCACGGEATGGAGGACCGCGAGGTGCTGTGTGGCGC  
 TTCGACTCCTCCTGGCCTTCAAGCACCGCGCGAGCTGCACCCGAGTTCTACAAGGACTGCTAA

Fig. 92A

40. 2003 CON C nef.PEP  
 MGKWSKSSIVGWP<sup>K</sup>PAVRERIRRT<sup>E</sup>PAE<sup>G</sup>VGAASQDL<sup>D</sup>KHGAL<sup>T</sup>SSNTATNNADCAWLEAQEEEEVGFPVRPQVPLRPM<sup>T</sup>YKAAFDLSFFL  
 KEKGGLEGLIYSKKRQ<sup>E</sup>ILDLWVYHTQGF<sup>F</sup>PDWQNYTPGPGVRYPLTFGWCFLV<sup>P</sup>DPREVEEANE<sup>G</sup>ENNSLLHPMSQHMEDEDEDREVLKW  
 KFD<sup>S</sup>HLARRHMA<sup>R</sup>ELHPEYKDC\$

Fig. 92B

2003 CON C nef.OPT  
 ATGGCGGCAAGTGGTCCAGTCTCCATCGTGGGTGGCCCGCGGTGGCGGAGGCGATCCGCCGACCCGAGCCCGCGAGGGCGGTGGG  
 CGCCGCTCCAGGACCTGGACAAGCACGGGCGCTGACCTCTCCAACACCGCCACCAACACGCCGACTGCGCTGGCTGGAGGCCCAGG  
 AGGAGGAGGAGTGGGCTTCCCGTGGCGCCCGAGGTGCCCTGCGCCCATGACCTACAAAGCGCGCTTCGACCTGTCTTCTCCTG  
 AAGGAGAAGGCGGCTGGAGGCGCTGATCTACTCAAGAAGCGCAGGAGATCCTGGACCTGTGGGTGTACCAACCCAGGGCTACTTCCC  
 CGACTGGCAGAACTACACCCCGCGCGTGGCTGCGCTACCCCTGACCTTCGGCTGTGCTTCAAGCTGGTGGCGGTGACCCCGCGAGG  
 TGGAGGAGGCCAACGAGGCGGAGAACAACTGCCTGTGTGACCCCATGTCCAGCACGGCATGGAGGACCGGAGGTGCTGAAGTGG  
 AAGTTCGACTCCCACTGGCCCGCGGAGCTGCACCCCGAGTACTACAAGGACTGCTAA

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Fig. 92C

## 41. 2003 C.anc nef. PEP

MGGKWSKSSIVGWPAVRERMRRTPEAAEGVGAASQDLDDKHGALTSSNTAANNADCAWLEAQEEEEVEVFPVLPQVPLRPMTYKAAFDSLFFL  
KEKGLDGLIYSKKRQEIILDWYHTQGYFPDWNQYTPGPGVRYPLTFGWCFKLVPVDPREVEEANEGENNCLLHPMSQHGMEDDEDREVILKW  
KFDSLHARRHMARELHPEYYKDC\$

Fig. 92D

## 2003 C.anc nef. OPT

ATGGCGGCAAGTGGTCCCAAGTCCTCCATCGTGGGTGGCCCGCGGTGGCGAGCGCATGCCGCCGACCGAGCCCGCCGCGAGGGCGGTGGG  
CGCCGCTCCAGGACCTGGACAAGCAGCGCCCTGACCTCTCAACACCGCCGCCAACACGCCGACTGGCCTGGCTGGAGGCCCAGG  
AGGAGGAGGAGGTGGGCTTCCCGTGGCCCGCCAGGTGGCCCTGCGCCCATGACCTACAAGGCCGCTTCGACCTGTCTCTTCTCCTG  
AAGGAGAAGGGCGGCTGGACGGCTGATCTACTCCAAGAAGCGCCAGAGATCCTGGACCTGTGGGTGTACACACCCAGGGCTACTTCCC  
CGACTGGCAGAACTACACCCCGGCGGTGGCTACCCCTGACCTTCGGTGGTGTCAAGCTGGTGGCCGTGGACCCCGCGAGG  
TGGAGGAGGCCAACGAGGGCGGAGAACAACTGCTGTGCACCCCATGTCCAGCACGGCATGGAGGACGAGACCGCGAGGTGCTGAAGTGG  
AAGTTCGACTCCCACTGGCCCGCGCCACATGGCCCGCGAGCTGCACCCGAGTACTACAAGGACTGCTAA

Fig. 93A

## 42. 2003 CON D nef. PEP

MGGKWSKSSIVGWPAIRERIRRTPEAADGVGAVSRDLEKHGALTSSNTAATNADCAWLEAQEEEEVEVFPVLPQVPLRPMTYKAAALDSLHFL  
KEKGGLEGLVWSQKRQEIILDWYNTQGFPPDWNQYTPGPGIRYPLTFGWCFELVPVDPREEVEEATEGENNCLLHPMCQHGMEDPEREVLWW  
RFNSRLAFEHKARVLHPEFYKDC\$

Fig. 93B

## 2003 CON D nef. OPT

ATGGCGGCAAGTGGTCCCAAGTCCTCCATCGTGGGTGGCCCGCGCATCCGGAGCGCATCCGCCGACCGAGCCCGCCGCGAGGGCGGTGGG  
CGCCGTGTCCCGGACCTGGAGAAGCAGGGCCCATCACTCTCAACACCGCCGCCAACACGCCGACTGGCCTGGCTGGAGGCCCAGG  
AGGAGGACGAGGAGGTGGCTTCCCGTGGCCCGCCAGGTGCCCTGCGCCCATGACCTACAAGGCCCGCCCTGGACCTGTCCCACTTCTG  
AAGGAGAAGGGCGGCTGGAGGCTGTGTGTCCAGAAGCGCCAGGAGATCCTGGACCTGTGGGTGTACAACACCCAGGGCTTCTTCCC  
CGACTGGCAGAACTACACCCCGGCGCATCCGCTACCCCTGACCTTCGGCTGGTGTTCGAGCTGGTGGCCGTGGACCCCGAGGAGG  
TGGAGGAGGCCAACGAGGGCGGAGAACAACTGCTGTGCACCCCATGTGCCAGCACGGCATGGAGGACCCCGAGCGGAGGTGCTGATGTGG  
CGCTTCAACTCCCGCTGGCCTTCGAGCACAAAGGCCCGCGTGTGCACCCCGAGTCTACAAGGACTGCTAA

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Fig. 94A

**43. 2003 CON F1 nef.PEP**

MGGKWSKSSIVGWPVAVRMRPTPPAAEGVGAVSQDLERRGAI TSSNTGATNPDLAWLEAQEEEEVEGFPVRPQVPLRPMTYKGAVDLSHFLK  
 EKGGLEGLIYSKKRQEI LLDLVYHTQGYFPDQNYTPGPIRYPLTFGWCFKLV PVDPEEVEKANEKENNCLLHPMSQHGMEDREVLINWK  
 FDSRLALRHIARERHPEFYQD\$

Fig. 94B

**2003 CON F1 nef.OPT**

ATGGCGGCAAGTGGTCCAGTCTCCATCGTGGGTGGCCCGCGTGGCGAGCGCATGCGCCCCCAACCCCCCGCCGAGGGCGGTGGG  
 CGCCGTGTCCCAGGACCTGGAGCGCGGCCATCACCTCCAACACCGCGGCCACCAACCCGACCTGGCCTGGCTGGAGGCCCCAGG  
 AGGAGGAGAGGTGGCTTCCCGTGGCGCCCGCCAGGTGACCTACAGGGCGCGTGGACCTGTCCCACTTCCCTGAAG  
 GAGAGGGCGCTGGAGGCTGATCTACTCCAAGAAGCGCCAGGAGATCCTGGACCTGTGGGTGTACACACCCAGGGCTACTTCCCCGA  
 CTGGCAGAACTACACCCCGGCCCGGCATCCGCTACCCCTGACCTTCGGCTGGTCTCAAGCTGGTGCCCGTGACCCCGAGGAGGTGG  
 AGAAGGCCAACGAGGGCGAGAACACTGCTGTCACCCCATGTCCAGCAGGCATGGAGACCGGAGGTGCTGATCTGGAAG  
 TTCGACTCCCGCTGGCCCTGCGCCACATCGCCCCGAGCGCCACCCGAGTTCTACAGGACTAA

Fig. 95A

**44. 2003 CON F2 nef.PEP**

MGGKWSKSSIVGWPVAVRMRPTPPAAEGVGAVSQDLDKHGAI TSSNTRATNADLAWLEAQEEDVEGFPVRPQVPLRPMTYKAAFDLSHFLK  
 EKGGLEGLIYSKKRQEI LLDLVYHTQGYFPDQNYTPGPIRYPLTFGWCFKLV PVDPEEVEKANEKENNCLLHPMSLHGMEDREVLKWK  
 FDSRLALRHIARERHPEYKDS

Fig. 95B

**2003 CON F2 nef.OPT**

ATGGCGGCAAGTGGTCCAGTCTCCATCGTGGGTGGCCCAACCATCCGCGAGCGCATCCGCGCACCCCGTGCCCGGAGGGCGGTGGG  
 CGCCGTGTCCCAGGACCTGGACAAGCAGCGGCCATCACCTCTCCAACACCGCGGCCACCAACGCCGACCTGGCCTGGCTGGAGGCCCCAGG  
 AGGACGAGGAGGTGGCTTCCCGTGGCGCCCGCCAGGTGCCCCATGACCTACAGGCCCGCTTCGACCTGTCCCACTTCCCTGAAG  
 GAGAGGGCGGCTGGAGGCTGATCTACTCCAAGAAGCGCCAGGAGATCCTGGACCTGTGGGTGTACCAACCCAGGGCTACTTCCCCGA  
 CTGGCAGAACTACACCCCGGCCCGGCACCGCTACCCCTGACCTTCGGCTGGTGTCTCAAGCTGTGCCCCGTGGACCCCGAGGAGGTGG  
 AGAAGGCCAACGAGGGCGAGAACACTGCTGTCACCCCATGTCCCTGCACGGCATGGAGGACGAGGACCGGAGGTGCTGAAGTGAAG  
 TTCGACTCCCGCTGGCCCTGCGCCACATCGCCCCGAGCGCACCCCGAGTACTACAAGGACTAA

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Fig. 96A

45. 2003 CON G nef. PEP  
 MGKWSKSSIVGWPEVRERIRQTPPAEGVAVSQDLARHGAISSNTAANNPDCAWLEAQEEDSEVGFVRPQVPLRPMTYKGAFDLSFFL  
 KEKGGLDGLIYSKKRQDILDWVYNTQGFEPDWQNYTPGPGTRFPLTFGWCFKLVPMDPAEVEEANKGENNSLLHPICQHGMEDEEREVLVW  
 RFDSSLARRHIARELHPEYKDC\$

Fig. 96B

2003 CON G nef. OPT  
 ATGGCGGCAAGTGGTCCAAGTCTCATCGTGGGTGGCCGAGGTGGGAGCGCATCCGCCAGACCCCCCGCCGCGAGGGCGTGGG  
 CGCCGTGTCCAGGACCTGGCCCGCCACGGCGCCATCACCTCTCAACACGCGCCCAACAACCCGACTGCGCTGGCTGGAGGCCCAGG  
 AGGAGGACTCCGAGGTGGCTTCCCGTGGCCGCCAGGTGCCCCCTGCGCCCATGACCTACAAGGGCCCTTCGACCTGTCTTCTTCCCTG  
 AAGGAGAAGGGCGGCTGGACGGCTGATCTACTCCAAGAAGCGCCAGGACATCTGGACCTGTGGGTGTACAACACCCAGGGCTTCTTCCC  
 CGACTGGCAGAACTACACCCCGGCCACCCGCTTCCCGTACCTTCGGCTGGTCAAGCTGGTGCCCATGGACCCCGCCGAGG  
 TGGAGGAGGCCAACAAAGGGCGAGAACACTCCCTGCTGACCCCATCTGCCAGCACGGCATGGAGGACGAGGACCGGAGGTGCTGTGTGG  
 CGCTTCGACTCCTTCCCTGGCCCGGCACATCGCCCGGAGTGCACCCGAGTACTACAAGGACTGCTAA

Fig. 97A

46. 2003 CON H nef. PEP  
 MGKWSKSSIGGWPAIRERIRRAEPAAEGVAVSRDLDRRGAVTINNASTNPDSAWLEAQEEEEVEVGFVRPQVPLRPMTYKGAFDLSHFL  
 KEKGGLEGLIYSKKRQEILDWVYNTQGYFPDWQNYTPGGERYPLTFGWCFKLVVPDPQVEVEKANEGENNSLLHPICQHGMEDEEREVLW  
 KFDSRLAFRHHIARELHPEFYKDC\$

Fig. 97B

2003 CON H nef. OPT  
 ATGGCGGCAAGTGGTCCAAGTCTCATCGGCGGTGGCCGCGCATCCGGAGCGCATCCGCCGCGCCGAGCCCGCCGAGGGCGTGGG  
 CGCCGTGTCCCGGACCTGGACCGCGCGGCGCGTACCATCAACAACACCGCCTCCACCAAGCCCGACTCCGCTGGCTGGAGGCCCAGG  
 AGGAGGAGGAGGTGGCTTCCCGTGGCCCGCCAGGTGCCCTGGCCCATGACCTACAAGGGCGCTTCGACCTGTCCCACTTCCCTG  
 AAGAGAAGGGCGGCTGGAGGCTGATCTACTCAAGAAGCGCCAGGAGATCCTGGACCTGTGGGTGTACAACACCCAGGGCTACTTCCC  
 CGACTGGCAGAACTACACCCCGGCCGAGCGCTACCCCTGACCTTCGGCTGGTGTCAAGCTGGTGCCTGACCCCGGAGGAGG  
 TGGAGAAGGCCAACGAGGGCGAGAACACTCCCTGTGTGACCCCATCTGCCAGCACGGCATGGAGGACGAGGAGCGGAGGTGCTGATGTGG  
 AAGTTCGACTCCCGCTTGGCCCTTCGCGCCACATCGCCCGGAGGTGCACCCCGAGTCTACAAGGACTGCTAA



Fig. 100A

49. 2003 CON 04 CFX nef. PEP  
 MGKWSKSSIVGWP<sup>AI</sup>RRMRQRGPAQAEPAAAGVAVSQDLDKHGAITSSNTAATNPDKAWLEAQEEEEVEGFPVRPQVPLRPMTFKAALD  
 LSHFLKEKGGLDGLIYSKKRQEILDLWVYHTQGYFFPDWQNYTPGGERFPLCFGWCFKLVDPDPQEEVEATEGENNCLLHPISQHGMEDEER  
 EVLKWKFDSRLAYKHIARELHPEFYKDC\$

Fig. 100B

2003 CON 04 CFX nef. OPT  
 ATGGGCGGCAAGTGGTCCAGTCCATCGTGGGTGGCCCGCCATCCGGAGCGCATGCGCCAGCGGGCCCCAGGCCGAGCCCCG  
 CGCCGCCGGCGTGGCGCCGTGTCAGGACCTGGACAAGCAGCGGCCATCACTCTCCAACACCGCCGCCACCAACCCCGACAAGGCCT  
 GGCTGGAGGCCCAGGAGGAGGAGGTGGGCTTCCCGTGGCCCCCAGGTGCCCTGCCCCATGACCTTCAAGGCCGCCCTGGAC  
 CTGTCCCACTTCTGAAGGAGAGAGGGCGCCTGGACGGCCTGATCTACTCCAAGAAGCGCCAGGATCCTGGACCTGTGGGTGTACAACAC  
 CCAGGGCTACTTCCCCGACTGGCAGAACTACACCCCGGCCCGGAGCGCTTCCCCGTGTCTCGGCTGGTCTTCAAGCTGGTGCCCG  
 TGGACCCCAAGGAGGTGGAGGAGCCACCGAGGGCGAGAACAACTGCCTGTGTCACCCCATCTCCAGCAGGCATGGAGGACGAGGAGCGC  
 GAGGTGCTGAAGTGAAGTTCGACTCCCCGCTGGCCTACAAGCACATCGCCCGGAGCTGCAACCCGAGTTCTACAAGGACTGCTAA

Fig. 101A

50. 2003 CON 06 CFX nef. PEP  
 MGKWSKSSIVGWP<sup>QV</sup>RRMRNPTEGAAGVAVSQDLDKHGAITSSNTATTNAACAWLEAQTEDEVGFPVRPQVPLRPMTYKGAFDLSFF  
 LKEKGGLDGLIYSKKRQEILDLWVYHTQGFFPDWQNYTPGIRYPLTFGWICYKLVDPDPKEVEEDTKGENNCLLHPMCQHGVDEEREVL  
 WKFDSSLARRHIAREMHPEFYKDC\$

Fig. 101B

2003 CON 06 CFX nef. OPT  
 ATGGGCGGCAAGTGGTCCAGTCCATCGTGGGTGGCCCCAGGTGCGCGAGCGCATGCGCAACCCCCACCGAGGGCCCCGAGGG  
 CGTGGCGCCGTGTCAGGACCTGGACAAGCAGCGGCCATCACTCTCCAACACCGCCACCAACCGCCTGCGCCTGGCTGGAGG  
 CCAGACCGAGGACGAGTGGGCTTCCCCGTGGCCCCCAGGTGCCCTGCGCCCCATGACCTACAAGGGCGCCTTCGACCTGCTCTTC  
 CTGAAGGAGAAAGGGCGCCTGGACGGCCTGATCTACTCAAGAAGCGCCAGGATCCTGGACCTGTGGGTGTACACACCCAGGGCTTCTT  
 CCCCAGTGGCAGAACTACACCCCGGCCCGCATCCGCTACCCCTGACCTTCGGCTGGTGTACAGCTGGTCCCCGTGACCCCAAGG  
 AGGTGGAGGAGGACCAAGGGCGAGAACAACTGCCTGTGCAACCCCATGTGCCAGCACGGCGTGGAGGACGAGGAGCGGCTGTGATG  
 TGAAGTTCGACTCTCCCTGGCCCGCCACATCGCCCGGAGATGACCCCCGAGTTCTACAAGGACTGCTAA

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Fig. 102A

## 51. 2003\_CON 08 BC nef.PEP

MGKWSKSSIVGWPÄIRERIRRTTEPAADGVGAVSRDLEKHGAITSSNTADTNADCAWLETQEEEEVGFVRPQVPLRPMTFKGALDLSFFLK  
 EKGGLEGLIYSKKRQEIILDLWVYHTQGYFPDWHNYTPGPGVRFLTFGWCFLVPVDPREVEEANEGEDNCLLHPVCQHGMEDEHREVLKWK  
 FDSQLAHRHRARELHPEFYKDC\$

Fig. 102B

## 2003\_CON 08 BC nef.OPT

ATGGCGGCAAGTGGTCCAAGTCCTCCATCGTGGGTGGCCGCCATCCGGAGCGCATCCGCCGACCGAGCCCCGCCGACGGCGTGGG  
 CGCCGTGTCCCGGACCTGGAGAACACGGCGCATCACCTCTCAACACCGCGGACACCAACGCCGACTGCGCTGGCTGGAGACCCAGG  
 AGGAGGAGGAGTGGCTTCCCGTGGCCCGCCAGGTGCCCTGCGCCCATGACCTTCAAGGGCGCCCTGGACCTGTCTTCTTCTGAAG  
 GAGAAGGGCGGCTGGAGGCTGATCTACTCAAGAAGCGCCAGGAGATCCTGGACCTGTGGGTGTACACACCCAGGCTACTTCCCCGA  
 CTGGCACAACTACACCCCGGCCCGCGTGGCTTCCCGTGGCTTCCCTGACCTTCCGCTGGTCAAGTGGTGGTGGACCCCGCGAGGTGG  
 AGGAGGCCAACGAGGGCGAGGACAACTGCTGTGCAACCGCATGGAGGACGACCGCGAGGTGCTGAAGTGGAG  
 TTCGACTCCGAGTGGCCACCGCCACCGCGAGTGCACCCCGAGTCTACAAGGACTGCTAA

Fig. 103A

## 52. 2003\_CON 10 CD nef.PEP

MGKWSKSSIVGWPÄVRERIRRTDPAEAGVGAASRDLEKYGAITSSNTAQTNPDCAWLEAQEEEEVGFVRPQVPLRPMTYKGFDSLFFL  
 KEKGGLEGLIYSKKRQDILDLWVYNTQGFDPWQNYTPGPGIRYPLTFGWCYKLVVDPREVEEANEGENNSLLHPMSLHGMEDEPHGEVLMW  
 KFDSNLAHKHMARELHPEYKDC\$

Fig. 103B

## 2003\_CON 10 CD nef.OPT

ATGGCGGCAAGTGGTCCAAGTCCTCCATCGTGGGTGGCCGCCATCCGGAGCGCATCCGCCGACCGACCCCGCCGCGAGGGCGTGGG  
 CGCCGCTCCCGGACCTGGAGAGTACGGCGCATCACCTCTCAACACCGCCGACCAACCCGACTGCGCTGGCTGGAGGCCAGG  
 AGGAGGAGGAGGAGTGGCTTCCCGTGGCCCGCCAGGTGCCCTGCGCCCATGACCTACAAGGGCGCTTCGACCTGTCTTCTTCTG  
 AAGGAGAAGGGCGGCTGGAGGCTGATCTACTCAAGCGCGCCAGGACATCCTGGACCTGTGGGTGTACAACACCCAGGCTTCTTCCC  
 CGACTGGCAGAACTACACCCCGGCCATCCGCTACCCCTGACCTTCGGCTGGTGTACAAGTGGTGGCGCTGGACCCCGCGAGG  
 TGGAGGAGGCCAACGAGGGCGAGAACAACTCCCTGCTGCAACCCCATGTCCCTGCACGGCATGGAGGACCGCCACGGCGAGGTGCTGATGTGG  
 AAGTTCGACTCCAACCTGGCCCAAGCACATGGCCCGGAGTGCACCCGAGTACTACAAGGACTGCTAA

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**Fig. 104A**

53. 2003 CON 11 CFX nef.PEP  
 MGKWSKSSIVGWEIRERLRRTPTAAAGVGAVSKDLEKHGAVTSNTAQTNAACAWLEAQEEEEVGFPVRPQVPLRPMTYKGAFDLGEF  
 LKEKGLDGLIYSKKRQEIILDLWVYHTQGYFPDWQNYTPGPIRYPLCFGWCFKLVPEPREVEEANEENNCLLHPMSQHGMDDEEREVLV  
 WKFDSSLARRHIARELHPDFYKDC\$

**Fig. 104B**

2003 CON 11 CFX nef.OPT  
 ATGGCGGCAAGTGGTCCAGTCTCCATCGTGGCTGGCCCGAGATCCGCGAGCGCTGCGCGCACCCCCCCCCACCGCCCGCCGAGGG  
 CGTGGCGCCGTGTCCAGGACCTGGAGAACACGGCGCGTGACCTCTCCAACACCGCCAGACCAACGCGCCTGCGCTGGCTGGAGG  
 CCCAGGAGGAGGAGGTGGCTTCCCCGTGCGCCCCCAGGTGCCCCCTGCGCCCATGACCTACAAGGCGCCTTCGACCTGGGCTTCTTC  
 CTGAAGGAGAGGGCGGCTGGACGGCTGATCTACTCAAGAAGCGCCAGGAGATCTTGACCTGTGGGTGTACCAACCCAGGGCTACTT  
 CCGGACTGGCAGAACTACACCCCGCGCCCGCATCCGCTACCCCTGTGCTTCGGTGGTTCAGCTGGTGGCGGAGAGGCGGCTGATG  
 AGGTGAGGAGGCGCAACGAGGCGGAGAACAACTGCCCTGTGCAACCCCATGTCCAGCACGGCATGGACGACGAGGAGCGCGAGGTGCTGATG  
 TGGAACTTCGACTCCTCCCTGGCCCGCCACATCGCCCGGAGCTGCACCCGACTTCTACAAGGACTGCTAA

**Fig. 105A**

54. 2003 CON 12 BF nef.PEP  
 MGKWSKSSIVGWEIRERLRRTPTAAAGVGAVSQDLENRGATSSNTRANPNPDIAWLEAQEEEEVGFPVRPQVPLRPMTYKGAIDLHFLK  
 EKGLEGLIYSKKRQEIILDLWVYHTQGYFPDWQNYTPGPIRYPLTFGWCFKLVDPDEEVEKANEENNCLLHPMSQHGMEDEDEVLMMWK  
 FDSRLALRHIAREKHPEFYQDC\$

**Fig. 105B**

2003 CON 12 BF nef.OPT  
 ATGGCGGCAAGTGGTCCAGTCTCCATCGTGGGTGGCCCGACATCCGGAGCGCATGCGCGGCCCCCGCCCGCCGAGGGCGTGGG  
 CGCGTGTCCCAGGACCTGGAGAACCGGGCGCATACCTCTCCAACACCGCGCCACAACCCGACCTGGCTGGTGGAGGCCCAGG  
 AGGAGGAGGAGGTGGCTTCCCCGTGCGCCCCCAGGTGCCCTGCGCGCCCATGACCTACAAGGCGCCCTGGACCTGTCCCACTTCTCTGAAG  
 GAGAAGGCGGCTGGAGGGCTGATCTACTCAAGAAGCGCCAGGAGATCTTGACCTGTGGGTGTACCAACCCAGGGCTACTTCCCCGA  
 CTGGCAGAACTACACCCCGGCGCATCCGCTACCCCTGACCTTCGGTGGTGTCAAGCTGGTGGCGGAGGAGGAGGTGG  
 AGAAGGCCAACGAGGCGGAGAACAACTGCTGTGCAACCCCATGTCCAGCACGGCATGGAGGACGAGGACCGCGAGGTGCTGATGTGGAAG  
 TTCGACTCCCGCTGGCCCTGCGCCACATCGCCCGGAGAACCCCGAGTTCTACCGAGACTGCTAA





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## Fig. 107B

2003 CON S pol. OPT

TTCTTCGGGAGAACCTGGCCCTCCAGCAGGGGAGGCCCGCGAGTTCTCTCCAGCAGACCCGGCGCAAATCCCCACCTCCCGGAGCTGCGCGTGCG  
 CGGGCGGACAAACCCCTGTCCGAGGCCGGCGCCGAGCGCCAGGGCACCGGTGTCCCTGTCTTCCCCAGATCACCTGTGGCAGCGCCCCCTGGTGACCG  
 TGAAGATCGGCGGCAGCTGAAGGAGGCCCTGCTGGACACCGCGCCGACACCCGTCTGGAGGAGATCAACCTGCCCGCAAAGTGAAGCCCAAGATG  
 ATCGGGCGCATCGCGGCTTTCATCAAGTGGCGCCAGTACGACCAAGATCTGTATCGAGATCTGCGGCAAGAAAGGCCATCGGCACCGTGTGTGGGGCCCCAC  
 CCCCCTGAACATCATCGGCGCGCAACATGCTGACCCAGATCGGCTGCACCCCTGAACCTTCCCCATCTCCCCCATCGAGACCGTCCCCGTGAAGCTGAAGCCCCG  
 GCATGGACGGCCCCAAGGTGAAGCAGTGGCCCCCTGACCGAGGAGAAAGATCAAGGCCCTGACCGAGATCTGCAAGAGATGGAGAAAGGCAAGATCTCC  
 AAGATCGGCCCCGAGAACCCCTACAAACACCCCATCTTCGCCATCAAGAAAGGACTCCACCAAGTGGCGCAAGCTGGTGGACTTCGCGGAGCTGAACAA  
 GCGCACCCAGGACTTCTGGGAGTGCAGCTGGGCATCCCCACCCCGCGGCTGAAGAAAGAAAGTCCGTGACCCGTGGACGTGGCGACGCTACT  
 TCTCCGTGCCCCCTGGACGAGACTTCCGCAAGTACACCGCCCTTACCATCCCTCCATCAACAAACGAGACCCCGGCATCCGCTACAGTACACGCTGCTG  
 CCCAGGGCTGGAAGGCTCCCGCCATCTTCCAGTCTTCATGACCAAGATCTCTGGAGCCCTTCCGCACCCAGAACCCCGAGATCGTGATCTACCACTA  
 CATGGACGACCTGTACGTGGCTCCGACCTGGAGATCGGCCAGACCCGACCAAGATCGAGGAGCTGCGCGAGCACCTGCTGCGCTGGGCTTACCAACCC  
 CCGACAAGAACCAAGAGGCCCTTCTGTGGATGGGTACGAGTGCACCCGACAAAGTGGACCGTGCAGCCCATCCAGCTGCCGAGAAAGGAC  
 TCCTGGACCGTGAACGACATCCAGAGCTGGTGGGCAAGCTGAACCTGGGCTCCAGATCTACCCCGCATCAAGTGAAGCAGCTGTCAAGCTGTCTGCG  
 CGGGCCAAAGGCCCTGACCGACATCGTGCCCCCTGACCGAGGAGCCGAGCTGGAGCTGGCCGAGAACCGCGAGATCTTGAAGGAGCCCGTGCACGGCGTGT  
 ACTACGACCCCTCCAAGGACCTGTATCGCCGAGATCCAGAAAGCAGGGCCAGGACCAAGTGGACCTTACAGATCTACAGGAGCCCTTCAAGAACTTGAAGACC  
 GGCAAGTACGCCAAGATGCGCTCGGCCACACCAACGACGTGAAGCAGCTGACCGAGGCCGTGCAGAAAGATCGCCACCGAGTCCATCGTGATCTGGGGCAA  
 GACCCCAAGTTCGGCTGCCATCCAGAAAGGAGACCTGGGAGACCTGGTGAACCTGAACTGGGCTCCAGATCTACCCCGCATCAAGTGAAGCAGCTGTCAAGCTGTCTGCG  
 CCCCCCTGGTGAAGCTGTGGTACCAGCTGGAGAGAGAGCCCATCGTGGGCGCCGAGACCTTCTACGTGGACGGCGCCCAACCGCGAGTGGAGTTCGTGAACA  
 GGCAAGCGCGGTACGTGACCGACCGCGGGGCGCCAGAAAGTGGTGTCCCTGACCGAGACCAACCAAGAAAGACCGAGCTGCAGGCCCATCCACCTGGCCCT  
 GCAGGACTCCGGCTCCGAGGTGAACATCGTGACCGACTCCAGTACGCCCTGGGCACTCATCCAGGCCCAAGCCCGACAAAGTCCGAGTCCGAGCTGGTGAACC  
 AGATCATCGAGCAGCTGATCAAGAAAGGAGAGGTGTACCTGTCTGGTCCCCCGCCCAAGGGCATCGGGCGCAACGAGCAGGTGGACAAAGTGGTTC  
 ACCGGCATCCGCAAGGTGCTGTCTTCTGGACGGCATCGACAAGGCCGAGGAGGACCGAGAAAGTACCACTCCAAGTGGCGGCCATGGCCTCCGACTTCAA  
 CCTGCCCCCATCGTGGCCAAAGAGATCGTGGCCCTCCTGCGAAGTGCCAGCTGAAGGGGAGGCCATGCACGGCCAGGTGGACTGCTCCCCCGGCATCT  
 GGCAGCTGGACTGCACCCACCTGGAGGGCAAGATCATCTGTGGTGGCCGTGCAGTGGCTCCGGCTCCGGCTACATCGAGGCCGAGGTGATCCCCCGGAGACCCGGC  
 CAGGAGACCGCTACTTTCATCTGAAGTGGCGCGCTGCCCCGTGAAGGTGATCCACACCGCAACCGGCTCCAACTTCACTCCGCGCCCGTGAAGGC  
 CGCTGTGTGGTGGCGCGCATCCAGCAGGAGTTCGGCATCCCTACAACCCCTCAGTCCAGGGCGTGTGGTGGTCCATGAACAAGGAGCTGAAGAAAGATCA  
 TCGGCCAGGTGCGGACACCGGAGCACCTGAAGACCGCCGTGCAGATGGCGTGTTCATCCACAACTTCAAGCGCAAGGGCGGCATCGGGGGTACTCC  
 GCCGCGAGCGCATCATCGACATCATCGCCACCGACATCCAGAGCTGCAGAGCATCACCAAGATCCAGAACTTCCGCGTGTACTACCGGA  
 CTCGCGGACCCCATCTGGAAGGGCCCGCAAGCTGTGTGAAGGGCGAGGGCGCGTGGTGTATCCAGGACAACTCCGAGATCAAGGTGGTGTCCCCCGC  
 GCAAGGCCAAGATCATCCGCGACTACGGCAAGAGATGGCGCGCCGACGACTGCGTGGCGCGCCGACGAGGACTAA

Fig. 108A

## 62 2003 M GROUP anc pol. PEP

FFRENLAFOQGEAREFSSEQTRANSPTSRELVRGGDNPLSEAGAERQGTVSFSFPQITLWQRPLVTIKIGGQREALLDTGADDTVLEEIN  
 LPGKWKPKMIGGIGGFIVKQYDQILIEICGKKAIGTVLVGPTPVNIIGRNMLTQIGCTLNFPISPIETVPVKLPKMGDPKVKQWPLTEEK  
 IKALTEICTEMEKEGKISKIGPENPYNTPVFAIKKSDSTKWRKLVDFRELNKRQDFWEVQLGIPHPAGLKKKSVTVLDVGDAYFSVPLDE  
 DFRKYTAFTIPSIINNETPGIRYQYNVLPQGWKGSPIAFQSSMTKILEPFRTKNPEIYIYQYMDLLYVGSDDLEIGQHRAKIEELREHLLRWGF  
 TTPDKKHQKEPPFLWMGYELHPDKWTVQPIQLPEKDSWTVNDIQKLVGKLNWASQIYPGKVKQKCLLRGAKALTDIVPLTEEALELEAEN  
 REILKEPVHGVYDPSKDLIAEIQKQGDQWYQIYQEPFNKLTGKYAKMRSATNDVKQLTEAVQKIATESIVWGKTPKFRPLPIQKETW  
 ETWTEYWQATWIPWEFEVNTFPLVKLWYLEKEPIVGAETFYVDGAANRETCLGKAGYVTDGRQKVVSLTETTNQKTELQAIHLALQDSG  
 SEVNIIVTDSQYALGIIQAQPKSESELVNOIEQLIKKEKVLVSWVPAHKGIGGNEQVDKLVSSGIRKVLFLDGDIDKAQEEHEKYHSNWRAM  
 ASDFNLPVVAKEIVASCDCQKLGKGEAMHGQVDCSPGIWQLDCTHLEKVLVAVHVASGYIEAEVIPAETGQETAYFILKLAGRWPVKVIH  
 TDNGSNFTSAAVKAACWAGIQOEFGIPYNPQSQGVVESMNKELKKIIGQVRDQAEHLKTAVQMAVFIHNFKRKGIGGYSAGERIIDIIAT  
 DIQTKELQKQITKIQNFRVYRDSRDPWKGPAKLLWKGEAVIQDNSEIKVVPRRKAKIIRDYKQMGAGDDCVAGRQDED\$

Fig. 109A

## 63. 2003 CON A1 pol. PEP

FFRENLAFOQGEAREFSSEQTRANSPTSRDLWDGGRDLSLPSEAGAERQGTGPTFSFPQITLWQRPLVTVRIGGQKEALLDTGADDTVLEDI  
 NLPKWKPKMIGGIGGFIVKQYDQILIEICGKKAIGTVLVGPTPVNIIGRNMLTQIGCTLNFPISPIETVPVKLPKMGDPKVKQWPLTEE  
 KIKALTEICTEMEKEGKISKIGPENPYNTPIFAIKKSDSTKWRKLVDFRELNKRQDFWEVQLGIPHPAGLKKKSVTVLDVGDAYFSVPLD  
 ESFRKYTAFTIPSTNNETPGIRYQYNVLPQGWKGSPIAFQSSMTKILEPFRSKNPEIYIYQYMDLLYVGSDDLEIGQHRKIEELRAHLLSWG  
 FTTPDKKHQKEPPFLWMGYELHPDKWTVQPIELPEKESWTVNDIQKLVGKLNWASQIYAGIKVKQKCLLRGAKALTDIVTLTEEALELEAE  
 NREILKDPVHGVYDPSKDLIAEIQKQGDQWYQIYQEPFNKLTGKYARKRSATNDVKQLAEVVQKVMESIVIWGKTPKFRPLPIQKET  
 WETWMDYWQATWIPWEFEVNTFPLVKLWYLEKDPVGAETFYVDGAANRETCLGKAGYVTDGRQKVVSLTETTNQKTELHAHLALQDS  
 GSEVNIIVTDSQYALGIIQAQPKRSESELVNOIEKLIGKDKVYLSWVPAHKGIGGNEQVDKLVSSGIRKVLFLDGDIDKAQEEHEKYHSNWR  
 MASDFNLPIVAKIEIVASCDCQKLGKGEAMHGQVDCSPGIWQLDCTHLEKVLVAVHVASGYIEAEVIPAETGQETAYFILKLAGRWPVKV  
 HTDNGSNFTSAAVKAACWAGIQOEFGIPYNPQSQGVVESMNKELKKIIGQVREQAEHLKTAVQMAVFIHNFKRKGIGGYSAGERIIDIIA  
 TDIQTKELQKQITKIQNFRVYRDSRDPWKGPAKLLWKGEAVIQDNSEIKVVPRRKAKIIRDYKQMGAGDDCVAGRQDED\$

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Fig. 109B

2003\_CON\_A1 pol. OPT

TTCTCCGCGAGAACCTGGCCCTCCAGACGGCGAGGCCCGCAAGTTCTCTCCGAGCAGACCGGCGCCCAACTCCCCACCTCCCGCGACCTGTGTGGACGG  
 CGGCGGCACTCCCTGCCCTCCGAGGCCGCGCGAGGCCAGGCCACCGGCCACCTTCTCTCCCAAGATACCTGTGTGGCAGCGCCCTCGGTGA  
 CCGTGGCATCGGCGGCAGCTGAAGGAGGCCCTGTGGACACCGCGCGACACACCTGTGTGGAGACATCAACCTGCCCGGCAAGTGAAGCCCAAG  
 ATGATCGGCGGCATCGGCGGCCTTATCAAGTGAAGCAGTACGACCATCTGTATCGAGATCTGCGGCAAGAGGCCATCGGCACCGTGTGTGGCCCC  
 CACCCCGTGAACATCATCGGCGCAACATCTGACCCAGATCGGCTGACCCCTGAACCTTCCCATCTCCCATCGAGACCGTGTGCGGTGAAGCTGAAGC  
 CCGCATGGACGGCCCCAAGTGAAGCAGTGGCCCCGTGACGAGGAGAAAGATCAAGGCCCTGACCGAGATCTGCACCGAGATGGAGAGGAGGGCAAGATC  
 TCCAAGATCGGCCCCGAGAACCCCTAGAACACCCCATCTTCGCCATCAAGAAGAGGACTCCACCAAGTGGCGCAAGCTGGTGGACTTCGCGGAGCTGAA  
 CAAGCGCACCCAGGACTTCTGGGAGGTGAGCTGGGCATCCCCACCCCGCGGCCCTGAAGAAGAAAGTCCGTGACCGTGTGGACCGTGGCGGACGCCCT  
 ACTTCTCCGTGCCCTGGACGAGTCTTCCGCAAGTACACCGCCCTTACCATCCCTCCACCAACGAGACCCCGGCATCCGCTACAGTACACGCTG  
 CTGCCCCAGGGCTGGAAGGGCTCCCCCGCATCTTCCAGTCTCCATGACCAAGATCTTGAGCCCTTCCGCTCCAAGAACCCCGAGATCATCTATCCA  
 GTACATGGACGACCTGTACGTGGCTCCGACTGGAGATCGGCCAGCACCGCACCAAGATCGAGGAGCTGGCGGCCACCTGTCTCTGGGGCTTACCA  
 CCCCCACAAGAAGCACCAAGAAGAGCCCCCTTCTGTGGATGGGCTACGAGCTGACCCCGACAAGTGGACCGTGCAGCCCATCGAGCTGCCCGAGAAG  
 GAGTCTTGACCGTGAACGACATCCAGAAGCTGGTGGCAAGCTGAACCTGGGCCCTCCAGATCTACGCCGGCATCAAGGTGAAGCAGCTGTCAAGCTGCT  
 GCGCGCGCCAAAGCCCTGACCGACATCGTGACCTGACCGAGGAGGCCGAGCTGGAGCTGGCGGAGAACCGCGAGATCTCTGAAGACCCCGTGCACGGCG  
 GTACTACGACCCCTCCAAGACCTGATCGCCGAGATCCAGAAGCAGGGCCAGGACCAAGTGGACCTACCAAGATCTACCAGGAGCCCTTCAAGAACCTGAAG  
 ACCGGCAAGTACGCCCGCAAGCGCTCGCCCCACACCAACGACGTGAAGCAGCTGGCCGAGGTGGTGCAGAAAGTGTGATGGAGTCCATCGTGATCTGGGG  
 CAAGACCCCAAGTCAAGCTGCCCATCCAGAAGGAGACCTGGGAGACCTGGTGGATGGACTACTGGCAGGCCACCTGGATCCCCGAGTGGGAGTTCGTGA  
 ACACCCCCCTGTGTGAAGCTGTGTACAGCTGGAGAAGGACCCCATCGTGGCGCCGAGACCTTCTACGTGGACGGCGCGCCCAACCGCGAGACCAAG  
 CTGGCAAGGCCCGCTACGTGACCGACCGCGCGCGAGAGGTGTCCCTGACCGAGACCAACCAAGAGACCGGAGCTGCACGCCATCCACCTGGC  
 CCTGCAGGACTCCGGCTCCGAGGTGAACATCGTGACCGACTCCAGTACGCCCTGGGCATCATCCAGGCCAGCCCGACCGCTCCGAGTCCGAGCTGGTGA  
 ACCAGATCATCGAGAAGCTGATCGGCAAGGACAAAGTGTACCTGTCTGGTCCCCCGCCACAAAGGCATCGGCGGCAACGAGCAGGTGGACAAGCTGGTG  
 TCCTCCGGCATCCGCAAGGTGTCTTCTGGACGGCATCGACAAAGGCCAGGAGGACGAGCGCTACCACTCCAACCTGGCGCGCCCATGGCCTCCGACTT  
 CAACCTGCCCCCATCGTGGCCCAAGGAGATCGTGGCTCTCTGGCAACAAGTGCCAGCTGAAGGGCGAGGCCATGACGGCCAGGTGGACTGCTCCCCCGGCA  
 TCTGGCAGCTGGACTGCACCCACCTGGAGGGCAAGTGTATCTTGTGGCCGTGCACGTGGCTCCGCTACATCGAGGCCGAGGTGATCCCCCGCGAGACC  
 GGCAGGAGACCGCTACTTCTGTGAAGCTGGCGCGCGCTGGCCCGTGAAGTGTGTCACACCGACAACGGCTCCAACCTCACCTCCGCGCGGTGA  
 GCGCGCTGTGTGGGCCAACATCCAGCAGGAGTTCGGCATCCCCCTACAAACCCCGAGTCCAGGGCGTGTGGAGTCCATGAACAAGAGCTGAAGAAGA  
 TCATCGGCCAGGTGGCGGAGCAGCGGAGCACCTGAAGACCGCGCTGAGATGGCCGTGTTCACAACTTCAAGCGCAAGGGCGGCATCGGCGGGCTAC  
 TCCGCGCGGAGCGCATCATCGACATCATCGCCACCGACATCCAGACCAAGGAGCTGCAGAAGCAGATCACCAAGATCCAGAACTTCCGCGGTACTACCG  
 CGACTCCCGCGACCCCATCTGGAAGGGCCCCGCGAGGGCGCGGTGGTGTATCCAGGACAACTCCGACATCAAGGTGGTGGTCCCC  
 GCGCAAGGCCAAGATCATCCGCGACTACGGCAAGCAGATGGCCCGCGGACGACTGCTGGTGGCGCGCGCAGGACGAGGACTAA

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## Fig. 109C

## 64. 2003 A1.anc pol. PEP

FFRENLAFOQGEARKFSSEQTRANSPTSRELWDGGRDLSLSEAGAERQGTVPFSFPQITLWQRPLVTVKIGGQLKEALLDTGADDTVLEDI  
NLPKWKPKMIGGIGGFIVKVRQYDQILIEICGKKAIGTVLVGPTPVNIIGRNMLTQIGCTLNFPIETVPVKLKPMDGPKVKQWPLTEE  
KIKALTEICTEMEKEGKISKIGPENPYNTPVFAIKKKDSTKWRKLVDFRELNKRTODFWEVQLGIPHPAGLKKKSVTVLDVGDAYFSVPLD  
ESFRKYTAFTIP SINNETPGIRYQYNVLPQGWKGPALFQSSMTKILEPFRSKNPEIYIYQYMDLTVGSDLEIGQHRAKIEELRAHLLSWG  
FTTPDKKHQKEPPFLWMGYELHPDKWTVQPIKLPKDSWTVNDIQKLVGKLNWASQIYAGIKVKQLCKLLRGAKALTDIVTLTEEALELEAE  
NREILKDPVHGYYDPSKDLVAEIQKQGDQWYQIYQEPFNLTGKYAKKRSHTNDVKQLTEVVQKVATESIWIWGKTPKFRPLPIOKET  
WETWMEYWQATWIPWEFEVNTPPLVKLWYQLEKEPIAGAEFYVDGAANRETGLGKAGYVTDGRQKVVSLETETTNQKTELHAIHLALQDS  
GSEVNIIVTDSQYALGIIQAQPDSESELVNIIEKLEKEKVYLSWVPVPAHKGIGGNEQVDKLVSSGIRKVLFLDGDIDKAQEEHEKYHSNWRA  
MASDFNLPPPIVAKEIVASCDCQLKGEAMHGQVDCSPGIWQLDCTHLEGKVLVAVHVASGYIEAEVIPAETGQETAYFLLLKLAGRWPVKV  
HTDNGSNFTSAAVKAACWWANIQQEFGIPYNPQSQGVVESMNKELKKIIGQVREQAEHLKTAVMVFIHNEKRGKGGIGGYSAGERIIDIIA  
TDIQTKELOKQITKIQNFRVYYRDSRDPINWGPAPKLLWKGEGAVVIQDNSDIKVPVPRRKAIIIRDYKQMGAGDDCVAGRQDED\$

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## Fig. 109D

2003\_A1.anc pol. OPT

TTCTCCGGAGAACCTGGCCTTCCAGAGGGCGAGGCCCGCAAGTTCTCTCCGAGCAGACCCGGCCAACTCCCCACCTCCCGGAGCTGTGGACGG  
 CGCCGGCACTCCCTGCTGTCCGAGGCCGGCGGAGCGCCAGGSCACCGTGCCCTCTCTCTCCCTCCAGATCACCTGTGGCAGCGCCCCCTGGTGA  
 CCGTGAAGATCGCGGCCAGCTGAAGGAGGCCCTGTGGACACCGCGCCGACACACCGTGCTGGAGGACATCAACCTGCCCGGAAGTGAAGCCCAAG  
 ATGATCGCGGGCATCGCGGGCTTCAATCAAGGTGCGCCAGTACGACCAAGATCCTGATCGAGATCTGCGGCAAGAGGCCATCGGCACCGTGTGTGGCCCC  
 CACCCCGTGAACATCATCGGCCGCAACATGCTGACCCAGATCGGTGACCCCTGAACCTCCCATCTCCCATCGAGACCGTGGCTGAAGCTGAAGC  
 CCGCATGGACGGCCCCAAGGTGAAGCAGTGGCCCCCTGACCGAGGAGAGATCAAGGCCCTGACCGAGATCTGCACCGAGATGGAGAGGCAAGATC  
 TCCAGATCGGCCCGAGAACCCCTACAACACCCCGTGTTCGCCATCAAGAAGAGGATCCACCAAGTGGCGCAAGCTTCCGAGCTGAA  
 CAAGGCACCCAGGACTTCTGGGAGGTGAGCTGGGCATCCCCACCCCGCGCCCTGAAGAAGAAAGTCCGTGACCGTGTGGACCGTGGCGGACGCTT  
 ACTTCTCCGTGCCCCCTGGACGAGTCTTCCGCAAGTACACCGCTTACCATCCCTCCATCAACAACGAGACCCCGGCATCCGCTACAGTACAACGTG  
 CTGCCCCAGGGTGAAGGGCTCCCCCGCATCTTCCAGTCCATGACCAAGATCCTGGAGCCCTCCGCTCCAAGAACCCCGAGATCGTGATCTACCA  
 GTACATGACGACCTGTACGTGGCTCCGACCTGGAGATCGGCCAGCACCGCGCCCAAGATCGAGGAGCTGCGCGCCCACTGCTGTCTGGGGCTTCACCA  
 CCCCCACAAGAACCCAGAGGAGGCCCTTCTGTGGATGGGCTACGAGCTGACCCCGCAAGTGGACCGTCAAGCCCATCAAGCTGCCCGAGAAG  
 GACTCTTGACCGTGAACGACATCCAGAAGCTGGTGGCAAGCTGAACCTGGGCTCCAGATCTACCGCGCATCAAGTGAAGCAGCTGTGCAAGCTGCT  
 GCGGGCGCAAGGCCCTGACCGACATCGTAGCCCTGACCGAGGAGGCCGAGCTGGAGCTGGCCGAGAACCGCGAGATCTTGAAGACCCCGTGCACGGCG  
 TGTACTACGACCCCTCCAAAGACCTGGTGGCCGAGATCCAGAAGCAGGGCCAGGACCAAGTGGACCTACCAGATCTACAGGAGCCCTCAAGAACCTGAAG  
 ACCGGCAAGTACCGCAAGAGCGCTCCGCCCAACCAACGACGTGAAGCAGCTGACCGAGGTGGTGCAGAAGTGGCCACCGAGTCCATCGTGATCTGGGG  
 CAAGACCCCAAGTTCGCTGCCCTGCCATCCAGAAGGAGACCTGGGAGACCTGGTGGATGGAGTACTGGCAGGCCACCTGGATCCCGAGTGGGAGTTCGTGA  
 ACACCCCCCTTGGTGAAGCTGTGTACCAAGCTGGAGAAGGAGCCCATCGCCCGCGCCGAGACCTTCTACGTGGACGGCGGCCCAACCGCGAGACCAAG  
 CTGGGCAAGGCCGCTACGTGACCGACCGCGCGCCGCGAGAGGTGGTGTCCCTGACCGAGACCCCAACCAAGAGACCGAGCTGCACGCCATCCACCTGGC  
 CCTGCAGGACTCCGGCTCCGAGGTGAACATCGTGACCGACTCCAGTACGCCCTGGGCATCATCCAGGCCCAGCCCGACCTCCGAGTCCGAGCTGGTGA  
 ACCAGATCATCGAAGCTGATCGAGAAGGAGAGGTGATCCTGTCTGGTGGCCGCGCCCAAGGGCATCGGCGGCAACGAGCAGGTGGACAAAGCTGGTG  
 TCCTCCGGCATCCGCAAGGTGCTGTCTGGACGGCATCGACAGGCCCAAGGAGGACCGAGAAGTACCACCTCCAACCTGGCGGCCATGGCCCTCCGACTT  
 CAACCTGCCCCCATCGTGGCCAAAGGAGATCGTGGCCCTCTGCGACAAGTGGCAGCTGAAGGGCGAGGCCATGCACGGCCAGGTGGACTGCTCCCCCGGCA  
 TCTGGCAGCTGGACTGCACCCACTGGAGGGCAAGGTGATCCTGGTGGCCGTGCACGTGGCTCCGGCTACATCGAGGCCGAGGTGATCCCCCGCGGAGACC  
 GGCCAGGAGACCGCTACTTCTCTGTGAAGCTGGCCCGCCGCTGGCCCGTGAAGTGGTGCACACCGACAACGGCTCCAACCTCACCTCCGCGCGCGTGA  
 GGCGGCTGTGTGGGCAACATCCAGCAGGAGTTCGGCATCCCCCTACAACCCCAAGTCCAGGGCGGTGGTGGAGTCCATGAACAAGGAGTGAAGAAGA  
 TCATCGGCCAGGTGCGGAGCAGGCCGAGACCTGAAGACCGCCGTGCAGATGGCCGTGTTCATCCACAACCTCAAGCGCAAGGGCGGCATCGGGCGGTAC  
 TCCGCGGCGAGCGCATCATGACATCATCGCCACCGACATCCAGACCAAGGAGCTGCAGAAGCAGATCAACAGATCCAGAACCTCCGCGTGTACTACCG  
 CGACTCCCGGACCCCATCTGGHAGGGCCCCCAAGCTGTGTGGAGGGCGAGGGCGCGGTGGTGTATCCAGGACAACCTCCGACATCAAGGTGTGTGCCCC  
 GCGCAAGGCCAAGATCATCCGGACTACGGCAAGCAGATGGCCGGCGCCCGCCAGGACGAGGACTAA

Fig. 110A

## 65. 2003 CON A2 pol. PEP

FFRENLA<sup>Q</sup>QREARKESEQN<sup>R</sup>ANSPTSRELNRGGRDNLLSEAGAE<sup>E</sup>EQTVHSCNFPQITLWQRP<sup>L</sup>VTVKIEGQLR<sup>E</sup>ALLDTGADDTVLE<sup>D</sup>I  
 NLPGKWKPMIGGIGFIKVRQYDQIAIEICCKRAIGTVLVGTPVNIIGRNMLVQLGCTINFPISPIETVPVKLPGMDGPKVKQWPLTEE  
 KIKALTEICKEMEKEGKISKIGPENPYNTPVFAIKKDKSTKWRKLVDFRELNKR<sup>T</sup>QDFWEVQLGIPHPAGLKKKSVTVLVDGDAYFSVPLH  
 EDFRKYTAFTIP<sup>S</sup>INNETPGIRYQYNVLPQGWKGS<sup>PAI</sup>FQSSMTKILEPFRSKNPEMVIYQYMDLLYVGS<sup>D</sup>LEIGQHRAKIEELRAHLLRWG  
 FTT<sup>P</sup>DKKHQKEPPFLWMGYELHPDKWT<sup>VQ</sup>PIKLEKDSWT<sup>VND</sup>IQKLVGKLNWASQIYAGIKVKQCKLLRGT<sup>KALT</sup>DIVTLTKEAELELEE  
 NREILKNPVHGVYDPSKDLIAEIQKQGQDQW<sup>TYQ</sup>IYQEPFKNLKTGKYAKRKSTHTNDVKQLTEAVQKIAIESIVIWGKTPK<sup>FR</sup>LPIQKET  
 WETWTEYWOATWIP<sup>EW</sup>EFVNTPPVLV<sup>KLWYQ</sup>LETEPIAGAE<sup>TFYVDGAANRETKLGKAGYVTD</sup>DRGRQKIVSLTETTNQKTELHAIY<sup>LALQDS</sup>  
 GLEVNIVTDSQYALGIIQAQPD<sup>RSE</sup>SELV<sup>Q</sup>IEK<sup>L</sup>IEKERVYLSWVP<sup>PAHKGIGGNEQVDKLVSSGIRKVLFLD</sup>GIDKAQEEH<sup>ERYH</sup>SNWRA  
 MAHDFNLPPIVAKEIVASCDKQ<sup>LKGEAMHGQVDCSPGIWQ</sup>LDC<sup>TH</sup>LEGK<sup>VI</sup>LVAVHVASGYIEAEVIPAETGQETAYF<sup>ILKLAGRWPVKVI</sup>  
 HTDNGPNFTSATVKAACWAGVQ<sup>Q</sup>EF<sup>G</sup>IPYNPQSQGVESM<sup>NKELKKII</sup>IGQVRDQAEHLK<sup>TAVQMAVFIHNF</sup>KRKGIGGYSAGERI<sup>IDI</sup>IA  
 TDIQTKELQKQITKIQNFRVY<sup>YRDSRDP</sup>IWKGP<sup>AKLLWKGE</sup>GA<sup>VVIQDN</sup>SDIKVVP<sup>RRKAKI</sup>IRDY<sup>GKQ</sup>MAGDDC<sup>VASRQ</sup>DEDS

Fig. 111A

## 66. 2003 CON B pol. PEP

FFREDLA<sup>F</sup>QOKAREFSSEQ<sup>T</sup>RANSPT<sup>R</sup>RELQVWGRDN<sup>NSLSEAGADRQGTVSF</sup>FPQITLWQRP<sup>LVT</sup>IKIGGQLKEALLDTGADDTVLEEM  
 NLPGRWKPMIGGIGFIKVRQYDQILIEICGHKAIGTVLVGTPVNIIGRNLLTQIGCTINFPISPIETVPVKLPGMDGPKVKQWPLTEE  
 KIKALVEICTEMEKEGKISKIGPENPYNTPVFAIKKDKSTKWRKLVDFRELNKR<sup>T</sup>QDFWEVQLGIPHPAGLKKKSVTVLVDGDAYFSVPLD  
 KDFRKYTAFTIP<sup>S</sup>INNETPGIRYQYNVLPQGWKGS<sup>PAI</sup>FQSSMTKILEPFRKQNP<sup>DIV</sup>IYQYMDLLYVGS<sup>D</sup>LEIGQHRTKIEELRQHLLRWG  
 FTT<sup>P</sup>DKKHQKEPPFLWMGYELHPDKWT<sup>VQ</sup>PIVLP<sup>PEKDSWT</sup>VNDIQKLVGKLNWASQIYAGIKVKQCKLLRGT<sup>KALT</sup>TEVIPLTEAELELAE  
 NREILKEPVHGVYDPSKDLIAEIQKQGQDQW<sup>TYQ</sup>IYQEPFKNLKTGKYARMRG<sup>AHTNDVKQLTEAVQKIA</sup>TESIVIWGKTPK<sup>FR</sup>LPIQKET  
 WEA<sup>WTEYWOATWIP</sup>EW<sup>EFVNTPPVLV</sup>KLWYQLEKEPIVGAET<sup>FYVDGAANRETKLGKAGYVTD</sup>DRGRQKVVSLTDTTNQKTELQAIH<sup>LALQDS</sup>  
 GLEVNIVTDSQYALGIIQAQPD<sup>KSE</sup>SELV<sup>Q</sup>IEQ<sup>L</sup>IKKEKV<sup>YLA</sup>WVP<sup>PAHKGIGGNEQVDKLV</sup>SAGIRK<sup>VLFLD</sup>GIDKAQEEH<sup>ERYH</sup>SNWRA  
 MASDFNLPPVVAKEIVASCDKQ<sup>LKGEAMHGQVDCSPGIWQ</sup>LDC<sup>TH</sup>LEGK<sup>II</sup>LVAVHVASGYIEAEVIPAETGQETAYF<sup>LLKLAGRWPVKTI</sup>  
 HTDNGSNFTSTTVKAACWAGIKQ<sup>EF</sup>GIPYNPQSQGVESM<sup>NKELKKII</sup>IGQVRDQAEHLK<sup>TAVQMAVFIHNF</sup>KRKGIGGYSAGERI<sup>VD</sup>IIA  
 TDIQTKELQKQITKIQNFRVY<sup>YRDSRDP</sup>LWKGP<sup>AKLLWKGE</sup>GA<sup>VVIQDN</sup>SDIKVVP<sup>RRKAKI</sup>IRDY<sup>GKQ</sup>MAGDDC<sup>VASRQ</sup>DEDS





2003 CON B pol.OPT

TTTCTCCGCGAGGACCTGGCCCTTCCCCCAGGGCAAGGCCCGCGAGTTCTCTCCGAGCAGACCCGCGCCAACTCCCCCAACCGCCGCGAGCTGCAGGTGTG  
GGCGCGGACAAACAATCCCTGTCGAGGCCGCGCGACCGCCAGGGCACCGTGTCTTCTCTTCCCCCAGATCACCTGTGGCAGCGCCCCCTGGTGA  
CCATCAAGATCGCGGCCAGCTGAAGAGGCCCTGCTGGACACCGGCCGACACACCTGCTGGAGGAGATGAACCTGCCCCGCGCGCTGGAAGCCCAAG  
ATGATCGCGGCATCGCGGCTTCAACAAGTGCGCCAGTACGACCAAGTCTGATCGAGATCTGGGCCACAAGGCCATCGGCACCTGCTGGTGGGCC  
CACCCCGTGAACATCATCGGCCGCAACCTGCTGACCCAGATCGGCTGCACCTGAACCTTCCCATCTCCCCATCGAGACCGTGCCTGTAAGCTGAAGC  
CCGCATGGAACGGCCCAAGTGAAGCAGTGGCCCTGACCGAGGAGAAGATCAAGGCCCTGGTGGAGATCTGCACCGAGATGGAGAAGGAGGCAAGATC  
TCCAAGATCGGCCCGAGAACCCCTACAACACCCCGCTGTTGCCATCAAGAAGAAGACTCCACCAAGTGGCGCAAGCTGGTGAATCTCCGCGAGCTGAA  
CAAGCGCACCCAGGACTTCTGGGAGTGCAGTGGGCATCCCCACCCCGCGCTGAAGAAGAAGTCCGTGACCGTGTGGACGTGGCGGACGCT  
ACTTCTCCGTGCCCTGGACAAGGACTTCCGCAAGTACACCGCTTCAACATCCCCCTCATCAACAACGAGACCCCGGSCATCCGCTACCAGTACAACGTG  
CTGCCCCAGGGCTGGAAGGGCTCCCCCGCCATCTTCCAGTCTCCATGACCAAGATCTTGAGCCCTTCCGCAAGCAGAACCCCGACATCGTGATCTACCA  
GTACATGGACGACCTGTACGTGGCTCCGACCTGGAGATCGGCCAGCACCGACCAAGATCGAGGAGTGGCCAGACCTGCTGCGTGGGGCTTCAACCA  
CCCCGACAAGAAGCACAGAAGGAGCCCTTCTGTGGATGGGTACGAGTGCACCCGACAAAGTGGACCGTGCAGCCCATCGTGTCCCCGAGAAG  
GACTCTTGACCGTGAACGACATCCAGAAGCTGGTGGGCAAGCTGAACCTGGGCTTCCAGATCTACGCCGSCATCAAGTGAAGCAGCTGTGCAAGCTGCT  
GGCGGCACCAAGGCCCTGACCGAGGTGATCCCCCTGACCGAGGAGCCGAGCTGGAGCTGGCCGAGAACCCGCGAGATCAAGTGAAGCAGCTGTGCAAGCTGCT  
TGATCTACGACCCCTTCAAGGACCTGATCGCCGAGATCCAGAAGCAGGCCAGGCCAGTGAACCTGAGCTGGGCTTCCAGATCTGCAAGCTGCT  
ACCGCAAGTACGCCCGCATGCGCGCGCCCAACCAACGACGTGAAGCAGCTGACCGAGGCCGTGCAGAAAGATGCCACCGAGTCCATCGTGATCTGGGG  
CAAGACCCCAAGTTCAAGTGGCCATCCAGAAGGAGACCTGGGAGGCCCTGGTGAACCGAGTACTGGCAGGCCACCTGGATCCCCGAGTGGGAGTTCGTGA  
ACACCCCCCTGTTGTAAGCTGTGTACAGCTGGAGAAGGAGCCCATCGTGGCGCGCGAGACCTTCTACGTGGACGGCGCGCCCAACCGCGAGACCAAG  
CTGGGCAAGGCCGGCTACGTGACCGACCGCGCGCCGAGAGGTGTCTCTGACCGACACCAACAGAAAGACCGAGCTGCAGGCCATCCACCTGGC  
CTGCAGGACTCCGGCTTGAGGTGAACATCGTGAACCGACTCCAGTACGCCCTGGGCATCATCCAGGCCAGCCGACAAAGTCCGAGTCCGAGCTGGTGT  
CCCAGATCATCGAGCAGCTGATCAAGAAGGAGAGGTGTACCTGGCTGGGTGCCGCCCAAGGCATCGCGGGCAACGAGCAGGTGGACAAGCTGGTG  
TCCCGCGGCATCCGCAAGGTGCTGTTCTTGACCGCATCGACAAGGCCCAAGGAGCAGAGAGTACCATTCCAATCGCGCGGCCATGGCCCTCCGACTT  
CAACCTGCCCGCGTGGTGGCCAAAGGAGATCGTGGCTCTTGGACAAGTGCAGTGAAGGGCGAGGCCATGACGGCCAGGTGGACTGCTCCCCCGGCA  
TCTGGCAGCTGGAATGCACCCACCTGGAGGGCAAGATCATCTGTTGGCCGTGCAGTGGCTTCCGGTACATCGAGGCCGAGGTGATCCCCCGCGAGACC  
GGCCAGGAGACCGCTACTTCTGTGAAGCTGGCCGCGCGCTGGCCCGTGAAGACCATCCACCCGACACCGCTCCAATTCACCTCCACCAACCGTGAA  
GGCGGCTTGTGTTGGCGCGCATCAAGCAGGAGTTCGGCATCCCCTACAACCCCGAGTCCGAGGCGTTCATCCACAACCTCAAGCGCAAGGGCGGCTAC  
TCATCGGCCAGGTGCGGACCAAGGCGGACCTGAAGACCGCGCTGCAGTGGCCGTTCATCCACAACCTCAAGCGCAAGGGCGGCTACCGCGGCTAC  
TCCGCGGCGAGCGCATCGTGGACATCATGCCACCGACATCCAGACCAAGGAGTGCAGAAGCAGATCACCAAGATCCAGACTTCCGCGTGTACTACCG  
CGACTCCCGGACCCCTGTGGAAGGGCCCGCAAGCTGCTGTGGAAGGGCGAGGGCGCGCTGGTGTATCCAGGACAACTCCGACATCAAGGTGGTGGCCCC  
CGCGCAAGGCCAAGATCATCCGCGACTACGGCAAGCAGATGGCCCGCGCAGCATGCTGCTGGCTCCCCCGAGGACGAGGACTAA

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## Fig. 111C

## 67. 2003 B.anc pol.pEP

FFRENLAFFPQKAREFSSEQTRANSPTRRELQVWGRDNNPLSEAGADROQTVSFSFPQITLWQRPLVTIKIGGOLKEALLDTGADDTVLEEM  
NLP GKWKPKMIGGIGGFIKVRQYDQILIEICGHAIGTVLVGPTPVNIIGRNLLTQIGCTLNFPIETVPVKLKP GMDGPKVKQWPLTEE  
KIKALVEICTEMEKEGKISKIGPENPYNTPVFAIKKSDSTKWRKLVDFEELNKRRTQDFEVLQLGIPHAGLKKKSVTVLVDVGDAYFSVPLD  
KDFRKYTAFTIP SINNETPGIRYQYNVLPQGWKGSPIAFQSSMTKILEPFRKQNPETIYIYQYMDLTVGSDLEIGQHRTKIEELREHLLRWG  
FTTPDKKHQKEPPFLWMGYELHPDKWTVQPIVLPEKDSWTVNDIQKLVGKLNWASQIYAGIKVKQLCKLLRGTKALTEVVP L TEEAELELAE  
NREILKEPVHGVYDDPSKDLIAEIQKQGGQWYQIYQEPFKNLKTGKYARMRGAHTNDVKQLTEAVQKIATESIIVWGKTPKFPLPIQKET  
WEAWWTEYWOATWIP EWEFVNTPPLVKLWYQLEKEPIVGAETFYVDGAANRET KLGKAGYVTDGRQKVVS L TDTTNQKTELQAIHLALQDS  
GLEVNI VTD SQYALGIIQAOPDKSESELVSQIIIEQLIKKEKVYLAWVPAHKGIGGNEQVDKLVSA GIRKVLFTDGDIDKAQEEHEKYHSNWRA  
MASDENLPPVVAKEIVASCDKQKGEAMHGQVDCSPGIWQDCTHLEKIIIVAVHVASGYIEAEVIPAETGQETAYFILKLAGRWPVKVI  
HTDNGSNFTSTTVKAACWWAGIKQEFGIPYNPQSQGVVESMNKELKKIIGQVRDQAEHLKTA VQMAVFIHNEFRKGGIGGYSAGERIVDIIA  
TDIQTKE LQKITKIQNFRVYYRDSRDP L WKGPAKLWKGEGAVVIQDN SDIKVVP RRKAKII RDY GKQ MAGDDC VASRQDED\$

## Fig. 111D

2003\_B.anc pol.1.OPT

TTCTTCGGGAGAACCTGGCCTTCCCCCAGGGCAAGGCGCGAGTTCTCTCCGAGACCCGCGCCCAACTCCCCACCCCGCGGAGCTGCAGGTGTG  
 GGGCCGGACAACAACCCCTGTCCGAGGCGCGCGCCGACCGCAGGGCACCGTGTCTCTCTTCTCTTCCCCCAGATCACCTGTGGCAGGCCCCCTGGTGA  
 CCATCAAGATCGGCGGCCAGCTGAAGGAGGCCCTGTCTGGACACCGGCGCCGACGACACCGTGTGGAGGAGATGAACCTGCCCGCAAGTGAAGCCCAAG  
 ATGATCGGCGGCATCGGCGGCTTCATCAAGGTGGCGCCAGTACGACCAAGATCCTGTATCGAGATCTGGGCCCAAGGCCATCGGCACCGTGTGTGGGGCCC  
 CACCCCGTGAACATCATCGGCGCAACCTGTGACCCAGATCGGCTGCACCTGAACCTTCCCATCTCCCCATCGAGACCGTGTCCGTGAAGCTGAAGC  
 CCGCATGGACGGCCCCAAGGTGAAGTGAAGTGGCCCTGACCGAGGAGAAAGATCAAGGCCCTGTGTGGAGATCTGCACCGAGATGGAGAGGAGGCAAGATC  
 TCCAAGATCGGCCCCGAGAACCCCTACAACACCCCGTGTTCGCCATCAAGAAGAGACTCCACCAAGTGGCGCAAGTGGTGGACTTCCGCGAGCTGAA  
 CAAGCGCACCCAGGACTTCTGGAGGTGCAGCTGGGCATCCCCACCCCGCGCTGAAGAAGAAAGTCCGTGACCGTGTGGACGTGGCGGACGCTT  
 ACTTCTCCGTGCCCCCTGGACAAGGACTTCCGCAAGTACACCGCTTACCATCCCTCCATCAACAACGAGACCCCGGCATCCGCTACGATACACCGT  
 CTGCCCCAGGCTGGAAGGCTCCCCCGCATCTTCCAGTCTCCATGACCAAGATCCTGGAGCCCTTCCGCAAGCAGAACCCCGAGATCGTGATCTACCA  
 GTACATGGACGACCTGTACGTGGCTCCGACCTGGAGATCGGCCAGCACCGCACCAAGATCGAGGAGTGGCGGAGCACCTGTGCGCTGGGGCTTCACCA  
 CCCCCGACAAGAAGCACCAAGAGAGCCCCCTTCCGTGGATGGGTACGAGCTGACCCCGACAAGTGGACCGTGCAGCCCATCGTGTGCCGAGAG  
 GACTCTCTGGACCGTGAACGACATCCAGAAGCTGGTGGCAAGTGAACCTGGCCCTCCAGATCTACGCGGCGATCAAGGTGAAGCAGCTGTCAAGCTGCT  
 GCGGGCACCAAGGCCCTGACCGAGGAGGCCGAGCTGGAGTGGCCGAGACCGGAGTGGCCGAGAACCGCGAGATCTTGAAGGAGCCCGTGCAGGCG  
 TGTACTACGACCCCTCAAGGACCTGATCGCGGAGATCCAGAAGCAGGAGGCGGAGTGGACCTACAGATCTACAGGAGCCCTTCAAGAACCCTGAAG  
 ACCGGCAAGTACGCCCCGATGCGCGGCGCCACCAACGACGTGAAGCAGCTGACCGAGGCGTGCAGAGATGCGCACCGAGTCCATCGTGATCTGGGG  
 CAAGACCCCTCAAGTCAAGCTGCCATCCAGAAGGAGACCTGGGAGGCTGTGGACCGGAGTGGCAGGAGTGCAGAGCCCATCGTGTGCCGAGAG  
 ACACCCCTCCCTGGTGAAGCTGTGGTACCAAGCTGGAGAGGAGCCCATCGTGGCGCGGAGACCTTCTACGTGGACGGCGGCCCAACCGGAGACCAAG  
 CTGGGCAAGGCGGCTACGTGACCGACCGCGGCGCCAGAGGAGTGTCTTACGTACGCGCTGGGATCCAGGCGCCAGCCGACCAACAGAGAGCCGAGTGCAGGCGCATCCACCTGGC  
 CCTGCAGGACTCCGGCTGGAGGTGAACATCGTGACCGACTCCAGTACGCGCTGGGATCCAGGCGCCAGCCGACCAAGTCCGAGTCCGAGTGGTGT  
 CCCAGATCATCGAGCAGCTGATCAAGAAGGAGAGGTGTACCTGGCTGGGTCCCGCCCAAGGGCATCGGCGGCAACGAGCAGGTGGACAAGCTGGTG  
 TCCGCGGCGCATCCGCAAGGTGTCTTGGACGGCATCGACAAGGCCAGGAGGACGAGAGTACCACTCCAACCTGGCGGCCATGGCTCCGACTT  
 CAACCTGCCCCCGTGGTGGCAAGGAGATCGTGGCTTCTGGCAAGTGCAGCTGAAGGGCGAGGCCATGACGCGCCAGGTGGACTGCTCCCCCGCA  
 TCTGGCAGCTGGAACCTGAGGCGCAAGATCATCTGTGGTGGCGGTGCAGCTGGCTCCGGCTACATCGAGGCGCGAGGTGATCCCCCGCGGAGACC  
 GGCCAGGAGACCGCTTCTCTGAAGCTGGCGGCGCTGGCGCGTGAAGTGTATCCACACCGACAAACGGCTCCAACTTCACTCCACACCGCTGAA  
 GGCCGCTGTGTGGCGCGCATCAAGCAGGAGTTCGGCATCCCCCTACAACCCAGTCCAGGGCGTGGTGGAGTCCATGAACAAGGAGTGAAGAAGA  
 TCATCGGCGCAGGTGGCGGACCGCGGAGACCTGAAGACCGCGGTGCAGATGGCGGTGTATCCACAACCTCAAGCGCAAGGGCGGATCGGCGGCTAC  
 TCCGCGGCGGAGCGCATCGTGGACATCATGCGCACCGGACATCCAGACCAAGGAGTGCAGAAGCAGATCACCAAGATCCAGAACTTCCGCGGTGTACTACCG  
 CGACTCCCGGACCCCTGTGGAAGGGCCCCGCAAGCTGTGTGGAAGGGCGGCGGCTGGTGTATCCAGGACAACTCCGACATCAAGGTGGTGGCCCC  
 GCGCAAGGCCAAGATCATCCGCGACTACGGCAAGCAGATGGCGCGGCGAGCTGCGTGGCTCCCGCGCAGGACGAGGACTAA

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Fig. 112A

68. 2003 CON C pol. pep

FFRENLAFFQGEAREFPSEQTRANSPTSRELVQRGDNPRSEAGAEQQTLNFPQITLWQRPVLSIKVGGQKEALLDTGADDTVLEEINLPG  
 KWKPKMIGGIGGFIKVRQYDQILLIEICGKKAIGTVLVGPTFPVNIIGRNMLTQIGCTLNFPISPIETVPVKLPGMDGPKVKQWPLTEEKIKA  
 LTAICEEMEKEGKITKIGPENPYNTPVFAIKKKDSTKWRKLVDFRELNKRQDFWEVQLGIPHPAGLKKKKSVTVDVGDAYFSVPLDEGFR  
 KYTAF'TIPSINNETPGIRYQYNVLPQGWKGSPIAFQSSMTKILEPFFRAQNPEIIVYQYMDLTVGSDLEIGQHRAKIEELREHLLKWGFTTP  
 DKKHQKEPPFLWMGYELHPDKWTVPQIQLPEKDSWTVNDIQKLVGKLNWASQIYPGKVRQLCKLLRGAKALTDIVPLTEEAELAELENREI  
 LKEPVHGVYDPSKDLIAEIQKHQDQWTYQIYQEPFKNLKTGKYAKMRTAHTNDVKQLTEAVQKIAMESIVIWGKTPKFERLP IQKETWETW  
 WTDYWAATWIPWEFVNTPPLVKLWYQLEKEPIAGAEFFYVDGAANRETKIGKAGYVTDGRQKIVSLTETTNQKTELOAIQALQDSGSEV  
 NIVTDSQYALGIIQAQPDKSESELVNQIIIEQLIKKERVYLSWVPAHKGIGGNEQVDKLVSSGIRKVLFLDGIDKAQEEHEKYHSNWRAMASE  
 FNLPPIVAKEIVASCDCQLKGEAIGHQVDCSPGIWQLDCTHLEGGKIIILVAVHVASGYIEAEVIPAETGQETAYYILKLAGRWPVKVIHTDN  
 GSNFTSAAVKAACWWAGIQEFGIPYNPQSQGVVESMKNELKKIIGQVRDQAEHLKTAVQMAVFIHNEKRKGGIGGYSAGERIIDIIATDIO  
 TKELQKQIIKIQNFRVYYRDSRDPWKGPAKLLWKGEAVVIQDNSDIKVVPRRKAKIIKDYGKQMGADCVAGRQDEDS

Fig. 112B

2003\_con\_c pol.1.OPT

TTCTTCCGCGAGAACTGGCCCTTCCCCAGGGGAGGCCCGGAGTTTCCCTCCGAGCAGACCCGCGCAACTCCACCTCCCGCAGCTGCAGGTGCG  
 CGGCGACAACCCCGCTCCGAGGCCGCGGAGCGCCAGGACCCCTGAACCTTCCCCAGATCACCTGTGGCAGCGCCCCCTGGTGTCCATCAAGGTGG  
 GCGCCAGATCAAGGAGGCCCTGTGGACACCGGCGCGACACCGTGTGGAGAGATCAACCTGCCCCGCAAGTGAAGCCCCAAGATGATCGGGCGGC  
 ATCGGGCGCTTATCAAGGTGCGCCAGTACGACCAAGATCCTGATCGAGATCTGGGCAAGAAGGCCATCGGCACCGTGTGGTGGCCCCACCCCCGTGAA  
 CATCATCGGGCGCAACATGTGACCCAGCTGGGCTGCACCTGAACCTTCCCATCTCCCCATCGAGACCGTGGCCCTGAAGCTGAAGCCCCGGCATGGACG  
 GCCCCAAGGTGAAGCAGTGGCCCCGTGACCGAGGAGAAGATCAAGGCCCTGACGCCATCTGCGAGGAGATGGAGAAGGAGGCAAGATCACCAAGATCGGC  
 CCGAGAACCCCTACAACACCCCGTGTTCGCCATCAAGAAGAAGGACTCCACCAAGTGGCGCAAGCTGGTGACCTCCGCGAGCTGAACAAGCGCACCCCA  
 GGACTTCTGGGAGGTGAGCTGGGCATCCCCACCCCGCGGCTGAAGAAGAAGTCCGTGACCGTGTGGACGTGGCGGACGCCCTACTTCTCCGTGC  
 CCTTGGACGAGGGCTTCCGCAAGTACACCGCTTACCAATCCCCCTCCATCAACAACGAGACCCCCGGCATCCGCTACCACTACAACCGTGTCCCCAGGGC  
 TGAAGGGCTCCCCCGCATCTTCCAGTCTCCATGACCAAGATCCTGGAGCCCTTCCGCGCCAGAACCCCGAGATCGTGATCTACAGTACATGGACGA  
 CCTGTACGTGGGCTCCGACCTGGAGATCGGCCAGCACCGCGCCAAGATCGAGAGCTGCGCGAGCACCTGTGAAGTGGGCTTCAACACCCCGACAGA  
 AGCACAGAAAGGAGCCCCCTTCTGTGGATGGGCTACGAGCTGACCCCGACAAAGTGGACCGTGCAGCCCATCCAGCTGCCCGAGAGGACTCCTGGACC  
 GTGAACGACATCCAGAAGCTGTGGCAAGCTGAACCTGGGCTTCCAGATCTACCCGGCATCAAGTGGCGCAGCTGTGCAAGCTGTGCGGGCGCCAA  
 GGGCTGACCGACATCGTGGCCCTGACCGAGGCGCGAGCTGGAGTGGCCGAGAACCGCGAGATCCTGAAGGAGCCCGTGCACGGCGTGTACTAGACC  
 CCTCCAAGGACCTGATCGCCGAGATCCAGAAGCAGGCGCACGACGTGGACCTACCAAGATCTACAGAGCCCTTCAAGAACCTGAAGACCGGCAAGTAC  
 GCCAAGATGCGCACCGCCACACGACGTGAAGCAGCTGACCGAGGCGCTGCAGAAGATCGCCATGAGTCCATCGTGATCTGGGGCAAGACCCCCAA  
 GTTCCGCCCTGCCATCCAGAAGGAGACCTGGAGACCTGTGTGACCGGCTTACTGGCAGGCCACCTGGATCCCGCAGTGGGAGTTCGTGAACACCCCCCCC  
 TGGTGAAGCTGTGGTACCAGCTGGAGAAGGAGCCCATCGCGGCGCCGAGACCTTCTAGTGGACGGCGCGCAACCGCGAGACCAAGATCGGCAAGGCC  
 GGCTACGTGACCGACCGCGCGCCGCGCAGAAAGATCGTGTCCCTGACCGAGACCCACCAAGAACGACCGAGCTGAGGCCATCCAGCTGGCCCTGCAGGACTC  
 CGGCTCCGAGGTGAACATCGTGACCGACTCCCACTACGCGCTGGGCTCATCCAGGCCAGCCCGACAAAGTCCGAGTCCGAGCTGGTGAACCAAGATCATCG  
 AGCAGCTGATCAAGAAGCGCGTGTACCTGTCCGTGGTGGCGCGCCCAAGGGCATCGGCGGCAACGAGAGGTGGACAAGCTGGTGTCTCCGGCATC  
 CGCAAGTGTGTCTTGGACGGCATCGACAAGGCCAGGAGGAGCACGAGAAGTACCCTCAACTGGCGGCCATGGGCTCCGAGTCAACCTGCCCTCCC  
 CATCGTGGCCAAAGGAGATCGTGGCCCTCTGGACAAGTGGCAGCTGAAGGGCGAGGCCATCCAGGCCAGGTGACTGTCCCCCGGCATCTGGCAGCTGG  
 ACTGCACCCACCTGGAGGGCAAGATCATCTGTGTGGCCGTGACGTGGCTCCGGCTACATCGAGGCCGAGGTGATCCCCCGCGAGACCGGCCAGGAGACC  
 GCCTACTACATCCTGAAGCTGGCCCGCGCTGGCCCGTGAAGTGTATCCACCGACAAAGGCTCCAATCACTCCGCGCGCGCTGAAGGCCGCTGTGTG  
 GTGGCGCGGCATCCAGCAGGAGTTCGGCATCCCTTACACCCCGCAGTCCGAGGCGTGGTGGAGTCCATGAACAAGGAGCTGAAGAAGATCATCGGCCAGG  
 TGGCGGACCCAGGCGAGCACCTGAAGACCGCGGTGAGATGGCCGTGTTCATCCACAATTCAAGCGCAAGGGCGGCATCGGCGGCTACTCCGCGCGCGAG  
 CGCATCATCGACATCATCGCCACCGATCCAGACCAAGGAGTGCAGAAGCAGATCATCAAGATCCAGAACTTCCGCGTGTACTACCGGACTCCCGCGA  
 CCCCATCTGGAAAGGGCCCGCAAGCTGTGTGGAAAGGGCGAGGGCGCGTGGTGTATCCAGGACAACCTCCGACATCAAGGTGGTGGCCCCCGCGCAAGGCCA  
 AGATCATCAAGGACTACGGCAAGCAGATGGCCGCGCGGCTGCGTGGCGCGCGCCAGGACGAGGACTAA

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## Fig. 112C

## 69. 2003 C. anc pol. pep

FFRENLAFFQGEAREFPSEQTRANSPTSRELQVGRDNPRSEAGAEQQGTLTLNFPQITLWQRPLVSIKVGQIKEALLDTGADDTVLEEINL  
 PGKWKPKMIGGIGGFIVKVRQYDQILIEICGKKAIGTVLVGPTPVNIIGRNMLTQLGCTLNFPISPIETVPVKLPGMDGPKVKQWPLTEEKI  
 KALTAICEEMEKEGKITKIGPENPYNTPVFAIKKSDTKWRKLVDFEELNKRQDFWEVQLGIPHPAGLKKKSVTVLDVGDAYFSPVPLDEG  
 FRKYTAFTIPSINNETPGIRYQYNVLPQGWKGSPIFQSSMTKILEPFRAQNPFIYIYQYMDLLYVGSDEIGQHRAKIEELREHLLKWGFT  
 TPDKKHQKEPPFLMMGYELHPDKWTVQPIQLPEKDSWTVNDIQKLVGKLNWASQIYPGIVKVRQLCKLLRGAKALTDIVPLTEEAELAELENR  
 EILKEPVHGVYDPSKDLIAEIQKQHDQWYQIYQEPFKNLKTGKYAKMRTAHTNDVKQTEAVQKIAMESIVIWGKTPKFRLP IQKETWE  
 TWWTDYWQATWIPWEFVNTPLVLKWLWQLEKEPIAGAEIFYVDGAANRETKIGKAGYVTDGRQKIVSLTETTNQKTELQAIQALQDSGS  
 EVNIVTDSQYALGIIQAQPKSESELVNQIIIEQLIKKEKVYLSWVPAHKGIGGNEQVDKLVSSGIRKVLFLDGDIDKAQEEHEKYHSNWRAMA  
 SEFNLPPIVAKIEIVASCDKQKLGEMHGQVDCSPGIWQLDCTHLEGKIIILVAVHVASGYIEAEVIPAETGQETAYFILKLAGRWPVKVIHT  
 DNGSNFTSAAVKAAACWWAGIQQEFGIPYNPQSQGVVESMNKELKKIIQOVDRDQAEHLKTAVQMAVEFIHNFKRKGIGGYSAGERIIDIIATD  
 IQTKELQKQIIKIQNFRVYRDSRDPINWGPAPKLLWKGEAVVIQDNSDIKVVPRRKAIIIRDYKQMGADCVAGRQDEDS

**Fig. 112D**

2003 C.anc pol.OPT

TTCTTCGCGAGAACCTGGCCTTCCCCAGGGCGAGGCCCCGGAGTTCCTCCGAGCAGACC CGCGCCAACTCCCCCACTCCCGGAGCTGCAGTTGGG  
CCGCGACAAACCCCGTCCGAGGCGCGCGAGCGCCAGGGCACCTGACCTGAACTTCCCCAGATCACCTTGTGGCAGCGCCCCCTGGTGTCCATCA  
AGGTGGGCGGCAGATCAAGAGGCCCTGCTGGACACCGCGCCGACACACCTGTGGAGGAGATCAACCTGCCCGGCAAGTGAAGCCCAAGATGATC  
GGGGCATTCGGCGCTTCATCAAGGTGGCCAGTACGACCAGATCTGTATCGAGATCTTGGGCAAGAAGGCCATCGGCACCGTGTGGTGGGCCCCACCC  
CGTGAACATCATCGGCCGCAACATGCTGACCCAGCTGGGCTGCACCTGAACTTCCCATCTCCCATCGAGACCGTGCCTGTAAGCTGAAGCCCCGGCA  
TGGACGGCCCCAAGGTGAAGCATGGCCCCCTGACCGAGGAGAAGATCAAGGCCCTGACCGCCATCTCGAGGAGATGGAGAAGGAGGCAAGATCACCAAG  
ATCGGCCCCGAGAACCCCTACAACACCCCCCGTGTTCGCCATCAAGAAGAAGGACTCCACCAAGTGGCGCAAGCTGGTGGACTTCCGCGAGCTGAACAAGCG  
CACCCAGGACTTCTGGGAGGTGCAGCTGGGCATCCCCACCCCGCGGCTGAAGAAGAAAGTCCGTGACCGTGTGGACGTGGCGGACGCCCTACTTCT  
CCGTGCCCTTGAACGAGGGCTTCCGCAAGTACACCGCTTCAACATCCCTCCATCAACAACGAGACCCCGGCATCCGCTACCAGTACAAAGTGTGCCC  
CAGGGCTGGAAGGGTCCCCCGCATCTTCCAGTCTTCCATGACCAAGATCTTGAGCCCTTCCGCGCCCAAGAACCCCGAGATCGTGATCTACCAAGTACAT  
GGACGACCTGTACGTGGCTCCGACCTGGAGATCGGCCAGCACCGGCCAAAGATCGAGGAGCTGGCGGAGCACCTGTCTGAAAGTGGGGCTTACCACCCCCCG  
ACAAAGAAGCACAGAAGGAGCCCCCTTCTGTGGATGGGTACGAGCTGCACCCCGACAAAGTGGACCGTCAAGTGCAGCCCATCCAGCTGCCGAGAAGGACTCC  
TGGACCGTGAACGACATCCAGAAGCTGTTGGGCAAGCTGAACGTGGGCTCCAGATCTACCCCGGCATCAAGTGCAGCTGTGCAAGCTGTGCGCGG  
CGCCAAGGCCCTGACCGACATCTGTCCTTGAACCGAGGCGGAGCTGGAGCTGGCGGAGATCCGCGGATCAAGTGCAGCTGCCGAGAGGAGTCC  
ACGACCCCTTCAAGSACCTGATCGCCGAGATCCAGAAGCAGGGCCACGACCATGACCTGAAGCAGCTGACCGAGGCCGTGCAGAAAGTGCCTGAGTCCATCGTGTGATCTGGGGCAAGAC  
AAGTACGCCAAGATGCGCACCGCCACACCAACGACGTGAAGCAGCTGACCGAGGCCGTGCAGAAAGTGCCTGAGTCCATCGTGTGATCTGGGGCAAGAC  
CCCCAAGTTCGGCTGCCATCCAGAAGGAGACCTGGTGGAGACCTGGTGGACCGACTTGGCAGGCCACCTGGATCCCGAGTGGGAGTTCGTGAACACCC  
CCCCCTGGTGAAGCTGTGTACAGCTGGAGAAGGAGCCCATCGCGGCGCGGAGACCTTCTACGTGGACGGCGCGCCCAACCGCGAGACCAAGATCGGC  
AAGGCCGGCTACGTGACCGACCGCGCGCGCCAGAAAGATCGTGTCTTACCGGAGACCAACCAAGAACCGAGCTGCAGGCCATCCAGCTGGCCCCTGCA  
GGACTCCGGCTCCGAGGTGAACATCGTGAACCGACTCCAGTACGCCCTGGGCATCATCCAGGCCACGCCCGACAAGTCCGAGTCCGAGCTGGTGAACCCAGA  
TCATCGAGCAGCTGATCAAGAAGGAGAAGTGTACCTGTCTGGTGGTCCCGCCACAAGGGCATCGGGGCCAACGAGCAGGTGGACAAAGCTGGTGAACCCAGA  
GGCATCCGCAAGTGTGTCTTGGACGGCATCGACAAGGCCAGGAGCAGAGAAGTACCATCCAATGGCGCGCCATGGCCCTCCGAGTTCACCT  
GCCCCCATCGTGGCCAAGAGATCGTGGCTCTTGCACAAGTGCAGTGAAGGCCAGTGAAGGGCGAGCCATGCACGGCCAGTGTGCTCCCCGGCATCTGGC  
AGCTGGACTGCACCCACCTGGAGGGCAAGATCATCTGTGGTGGCCGTGCAGTGGCTCCGGCTACATCGAGGCCGAGGTGATCCCCCGGAGACCGGCCAG  
GAGACCGCTACTTCATCTGAAGCTGGCCGGCCGTGGCCCGTGAAGGTGATCCACACCGACACCGGTCCAATTCACCTCCGCGCGCGTGAAGCGCGC  
CTGCTGGTGGCCCGGCATCCAGAGGAGTTCGGCATCCCCTACAACCCCGATCCAGGGCGTGGTGGAGTCCATGAACAAGGAGTGAAGAGATCATCG  
GCCAGGTGCGGACCGAGCACCTGAAGACCGCCGTGCAGATGGCCGTGTTCATCCACAACCTCAAGCGCAAGGGCGGCATCGGCGGTACTCCGCG  
GGCAGCGCATCATCGACATCATCGCACCGACATCCAGACCAAGAGGCTGCAGAAGCAGATCATCAAGATCCAGAACTTCGCGGTGTACTACCGCGACTC  
CCGCGACCCCATCTGGAAGGGCCCGCCAGCTGCTGTGGAAGGGCGAGGGCGCGCTGGTGTATCCAGGACAACTCCGACATCAAGGTGGTGGCCCCCGCA  
AGGCCAAGATCATCCGCGACTACGGCAAGCAGATGGCCGGCGCGGCTGCGTGGCGCGCGCCAGGACGAGGACTAA



Fig. 113A

## 70. 2003 CON D pol. PEP

FFRENLAFFQKAGELSSSEQTRANSPTSRELVRWGGDNPLSETGAERQGTVSFNFPOITLWQRPLVTIKIGGQKKEALLDTGADDTVLEEIN  
 LPGWKPKMIGGIGGFIVKROYDQILIEICGHKAIGTVLVGPTPVNIIGRNLLTQIGCTLNFPISPIETVPVKLPKPGMDGPKVKQWPLTEEK  
 IKALTEICTEMEKEGKISRIGPENPYNTPIFAIAKKDSTKWRKLVDFRELNRKTQDFWEVQLGIPHPAGLKKKSVTVLDVGDAYFVSPLDE  
 DERKYTAFTIPSIINNETPGIRYQYNVLPQGWKGSPIAFQSSMTKILEPFRKQNPFIYQYMDLLYVGSDEIGQHRTKIEELREHLLRWGF  
 TTPDKKHQKEPPFLWMGYELHPDKWTVQPIKLPEKESWTVNDIQLVGKENWASQIYPGKVRQLCKLLRGTKALTEVIPLETEEAELAELEN  
 REILKEPVHGVYDPSKDLIAEIQKQGQWTVQIYQEPFKNLKTGKYARMGAHTNDVKQLTEAVQKIAIESIVIWGKTPKFRLP IQKETW  
 ETWTEYQWATWIPWEFEVNTPPLVCLWYQLEKEPIIGAETFFYVDGAANRETKLGKAGYVTDGRQKVPLTDTTNQKTELQAINIALQDSG  
 LEVNI VTD SQYALGIIQAQPKSESELVSQIEQLIKKEKVYLAWPVPAHKGIGGNEQVDKLVNSGIRKVLFLDGDIDKAQEEHEKYHNNWRAM  
 ASDENLPPVVAKEIVASCDCQLKGEAMHGQVDCSPGIWQLDCTHLEGVILVAVHVASGYIEAEVIPAETCQETAYFLKLGRWPVKVH  
 TDNGSNFTSAAVKAACWWAGIKQEFGIPYNPQSQGVESMKNELKKIIGQVRDQAEHLKTAVQMAVFIHNEFRKGGIGGYSAGERIIDIIAT  
 DIQTKELQKQIIKIQNFVRVYRDSRDPWKGPAKLLWKGEAVIQDNSDIKVVP RRKVKIIRDYGKQMGAGDDCVASRQDEDS

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Fig. 114A

## 71. 2003 CON F1 pol. PEP

FFRENLAFFQGEARKFPSEQTRANSPASRELVRQGRDNPLSEAGAERRGTVPSLSFPQITLWQRPLVTIKIGGQKKEALLDTGADDTVLEDI  
 NLPGWKPKMIGGIGGFIVKROYDQILIEICGHKAIGTVLVGPTPVNIIGRNMLTQIGCTLNFPISPIETVPVKLPKPGMDGPKVKQWPLTEE  
 KIKALTEICTEMEKEGKISRIGPENPYNTPVFAIAKKDSTKWRKLVDFRELNRKTQDFWEVQLGIPHPAGLKKKSVTVLDVGDAYFVSPLD  
 KDFRKYTAFTIPSVNNETPGIRYQYNVLPQGWKGSPIAFQCSMTKILEPERTKNPDIYIYQYMDLLYVGSDEIGQHRTKIEELREHLLRWG  
 FTTPDKKHQKEPPFLWMGYELHPDKWTVQPIQLPKDSWTVNDIQLVGKLNWASQIYPGKVRQLCKLLRGAKALTDIVPLTAAEAELELAE  
 NREILKEPVHGVYDPSKDLIAEIQKQGQWTVQIYQEPFKNLKTGKYAKMRSHTNDVKQLTEAVQKIALESIVIWGKTPKFRLPILKET  
 WDTWWTDYWQATWIPWEFEVNTPPLVCLWYQLETEPIVGAETFFYVDGASNRETKKGAGYVTDGRQKVPLTDTTNQKAELOAIHLALQDS  
 GSEVNI VTD SQYALGIIQAQPKSESELVNQIEQLIKKEKVYLSWVPVPAHKGIGGNEQVDKLVNSGIRKILFLDGDIDKAQEEHEKYHNNWRA  
 MASDENLPPVVAKEIVASCDCQLKGEAMHGQVDCSPGIWQLDCTHLEGKIILVAVHVASGYIEAEVIPAETCQETAYFILKLGRWPVKII  
 HTDNGSNFTSAAVKAACWWAGIQEFGIPYNPQSQGVESMKNELKKIIGQVRDQAEHLKTAVQMAVFIHNEFRKGGIGGYSAGERIIDIIA  
 TDIQTRRELQKQITKIQNFVRVYRDSRDPWKGPAKLLWKGEAVIQDENSEIKVVP RRKAKIIRDYGKQMGAGDDCVASRQDEDS

Fig. 113B

2003\_con\_d pol:OPT

TTCTCCGGAGAACCTGGCCCTTCCCCAGGGCAAGCCGGCGAGCTGTCTCTCCGAGAGACCCGGGCCAACTCCCCACCTCCCGGAGCTGGCGGTGTG  
GGCGGGGACAAACCCCTGTCCGAGACGGCGCGAGCGCCAGGGCACCGTGTCTTCAACTTCCCCAGATCACCTGTGGCAGCGCCCTTGGTGACCA  
TCAAGATCGCGGGCCAGCTGAAGGAGGCCCTGTGGACACCGCGCCGACACACCGTGTGGAGGAGATCAACCTGCCCGCAAGTGAAGCCCAAGATG  
ATCGGGGCGATCGCGGGCTTCAATCAAGTGGCGCCAGTACGACAGATCTGTGATCGAGATCTGGCGGCCACAAGGCCATCGGCACCGTGTGGTGGGCCCCAC  
CCCCGTGAACATCATCGCGCCCAACCTGCTGACCCAGATCGGCTGACCTGAACCTTCCCATCTCCCATCGAGACCGTGCCTGAAGCTGAAGCCCG  
GCATGGACGGCCCCAAGGTGAAGCAGTGGCCCCGTGACCGAGGAGAAGATCAAGGCCCTGACCGAGATCTGCACCGAGATGGAGAAGGAGGCAAGATCTCC  
CGCATCGGCCCGAGAACCCCTACAACACCCCATCTTCGCCATCAAGAAGAGGACTCCACCAAGTGGCGCAAGCTGGTGAATTCGGGAGCTGAACAA  
GGCACCCAGGACTTCTGGAGGTGCAGCTGGGCATCCCCACCGCGCTGAAGAAGAGAGTCCGTGACCGTGTGGACGTGGCGGACGCTACT  
TCTCCGTGCCCCGTGGACGAGGACTTCCGCAAGTACACCGCTTCAACATCCCTCCATCAACAAACGAGACCCCGGCATCCGCTACCACTACCACTG  
CCCCAGGCTGAAGGCTCCCCCGCATCTTCAGTCTCCATGACCAAGATCTTGAGCCCTTCCGCAAGCAGAACCCCGAGATCGTGATCTACCACTA  
CATGGACGACCTGTACGTGGGTCCGACCTGGAGATCGGCCAGCACCGCACCAAGATCGAGGAGCTGCCGAGCACCTGCTGGCTTACCACTC  
CCGACAAGAAGCACCAAGAGGCCCTTCTCTGTGGATGGGTACGAGCTGACCCCGACAAAGTGGACCGTGCAGCCCATCAAGCTGCCGAGAAGGAG  
TCCTGGACCGTGAACGACATCCAGAAGCTGGTGGGCAAGCTGAACCTGGGCTCCAGATCTACCCCGCATCAAGTGGCGCAGCTGTGCAAGCTGCTGCG  
CGGACCAAGGCCCTGACCGAGGTGATCCCTGACCGAGGAGGCCGAGCTGGAGCTGGCGGAGAACCGCGAGATCTCTGAAGGAGCCCTGACCGCGTGT  
ACTACGACCCCTCCAAAGGACTGATCGCGAGATCCAGAAGCAGGGCCAGGCCAGTGGACTTACAGATCTACCAGGAGCCCTTCAAGAACCTGAAGACC  
GGCAAGTACGCCCGCATCGCGGGCCCCACACCAAGCAGTGAAGCAGTGAACCGGCGGTGCAGAAGATGCCATCGAGTCCATCGTGATCTGGGGCAA  
GACCCCAAGTTCGGCTGCCATCCAGAAGGAGACCTGGGAGACCTGGTGGACCGAGTACTGGCAGGCCACCTGGATCCCCGAGTGGGAGTTCGTGAACA  
CCCCCCCCCTGGTGAAGCTGGTACCAAGTGAAGAGGCCCATCATCGGCGCGGAGACCTTCTACGTGGACGGCGCGCCCAACCGCGAGACCAAGCTG  
GGCAAGGCCGGCTACGTGACCGACCGCGGGCCGACAGAGTGTGCCCCGTGACCGACACCAACCAAGACCGAGCTGCAGGCCATCAACCTGGCCCT  
GCAGGACTCCGGCTGGAGTGAACATCGTGACCGACTCCCACTACCGCTGGCATCATCCAGGCCAGCCCGACAAAGTCCGAGTCCGAGTGGTGTCCC  
AGATCATCGAGCAGCTGATCAAGAAGAGAGTGTACCTGGCTGGGTGCCGCCACAAGGGCATCGGGCGCAACGAGCAGGTGGAACAAGCTGGTGTCC  
AACGGCATCCGCAAGGTGTCTTCTGGACGGCATCGACAAGGCCCAAGGAGGAGCAGAGAGTACCAACAAGTGGCGCCATGGCCTCCGACTTCAA  
CCTGCCCCCCGTGGTGGCCAAAGGAGATCGTGGCTTCTTGGACCAAGTGGCCAGCTGAAGGGGAGGCCATGCACGGCCAGGTGGATCCCCCGGAGACCGGC  
GGCAGTGGACTGACCCCACTGGAGGGCAAGTGTATCTTGGTGGCCGTGACGTGGCTCCGGCTACATCGAGGCCGAGGTGATCCCCCGGAGACCGGC  
CAGGAGACCGCTACTTCTCTGTGAAGCTGGCCGCGCTGGCCGTGAAGTGTGCACACCGACACCGGTCCCACTTCACTCCCGCCCGCTGAAGGC  
CGCTGTGTGGCGCGCATCAAGCAGGAGTTCGGCATCCCCCTACAACCCCGTCCAGGGCGTGGTGGAGTCCATGAACAAGGAGCTGAAGAAGATCA  
TCGGCCAGTTCGGCAGCAGGCCAGCACCTGAAGACCGCGCTGCAGATGGCCGTGTTCATCCACAACCTCAAGCGCAAGGGCGGCATCGGGCGCTACTCC  
GCGGCGAGCGCATCATCGACATCATCGCCACCGACATCCAGACCAAGGAGCTGCAGAAGCAGATCATCAAGATCCAGAACCTTCCCGGTGTACTACCGGA  
CTCCCGGACCCCATCTGGAAGGGCCCCCGCAAGCTGTGTGGAAGGGCGAGGCCGCTGTGTATCCAGGACAACTCCGACATCAAGGTGGTGGTCCCCGCC  
GCAAGTGAAGATCATCCGCGACTACGGCAAGCAGATGGCCGGCGACGACTGCGTGGCTCCCCCGCAGGACGAGGACTAA

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Fig. 114B

2003\_CON\_F1\_pol.OPT

TTCTTCCGCGAGAACCTGGCCCTTCCAGCAGGGCGAGGCCCCGCAAGTTCCCTCCGAGCAGACCCGCGCCAACTCCCCCGCTCCCGGAGCTGCGCGTGCA  
 GCGGGCGACAACCCCTGTCCGAGGCCGCGCCGAGCGCCGCGCACCGTGCCTCCCTGTCTTCCCCAGATCACCTGTGGCAGCGCCCCCTGGTGA  
 CCATCAAGATCGGCGGCCAGCTGAAGGAGGCCCTGTGGACACCGGCGCCGACACACCGTGTGGAGACATCAACCTGCCCGGCAAGTGAAGCCCCAAG  
 ATGATCGGCGGATCGGCGGCTTCATCAAGGTGAAGCAGTACGACCAATCCTGATCGAGATCTGGGCCACAAGGCCATCGGCACCGTGTGGTGGCCCC  
 CACCCCGTGAACATCATCGGCGCAACATGCTGACCCAGATCGGCTGACCCCTGAACCTTCCCATCTCCCCATCGAGACCGTGCCTGAAGCTGAAGC  
 CCGCATGGACGGCCCCAAGGTGAAGCAGTGGCCCCCTGACCGAGGAGAAGATCAAGGCCCTGACCGAGATCGACCGAGATGAGAGGGCAAGATC  
 TCCAAGATCGGCCCCGAGAACCCCTACAACACCCCGTGTTCGCCATCAAGAAGAGACTCCACCAAGTGGCGCAAGCTGGTGGACTTCCGCGAGCTGAA  
 CAAGCGCACCCAGGACTTCTGGGAGGTGCAGCTGGGCATCCCCACCCCGCGGCTGAAGAAGAAGTCCGTGACCTGTGGACCTGGGGCGACGCCT  
 ACTTCTCCGTGCCCTGGACAAGGACTTCGCAAGTACACCGCTTACCATCCCTCCGTGAACAACGAGACCCCGGCTATCCGCTACAGTACAACGTG  
 CTGCCACAGGCTGGAAGGCTCCCCCGCCATCTTCCAGTGTCCATGACCAAGATCCTGGAGCCCTTCCGCACCAAGAACCCCGACATCGTGATCTACCA  
 GTACATGGACGACCTGTACGTGGCTCCGACCTGGAGATCGGCCAGCACCGCACCAAGATCGAGGAGCTGCGCGAGCACCTGTGTAAGTGGGCTTACCA  
 CCCCCACAAGAAGCACCAAGAGGCCCTTCTGTGGATGGCTACGAGCTGCACCCCGACAAGTGGACCGTGCAGCCCATCCAGCTGCCCGACAAG  
 GACTCTGGACCGTGAACGACATCCAGAAGCTGGTGGCAAGCTGAACCTGGGCCCTCCAGATCTACCCCGCATCAAGTGAAGCAGCTGTGCAAGCTGCT  
 GCGGGCGCAAGGCCCTGACCGACATCGTGCCTTACCGCGAGGCGGAGCTGGAGCTGGCGGAGAACCGGAGATCCTGAAGGAGCCCGTGCACGGCG  
 TGTACTACGACCCCTCCAAGGACCTGATCGCCGAGATCCAGAAGCAGGGCCAGGGCCAGTGGACCTACAGATCTACAGGAGCCCTTCAAGAACCTGAAG  
 ACCGCAAGTACGCCAAGATGGCTCCGCCACACCAAGCAGTGAAGCAGCTGACCGAGGCGTGCAGAAGATCGCCCTGGAGTCCATCGTGATCTGGGG  
 CAAGACCCCAAGTTCGCCCTGCCATCTTGAAGGAGACCTGGGACACCTGGTGGACCGACTACTGGCAGGCCACCTGGATCCCGAGTGGGAGTTCGTGA  
 ACACCCCGCTGTGAAGCTGTGGTACCAGCTGGAGACCGAGCCCATCTGTGGCGCGGAGACCTTCTACGTGGACGGCGCTCCAAACCGCGAGACCAAG  
 AAGGCAAGGCCGCTACGTGACCGACCGCGGCCAGAGGTGGTGTCCCTGACCGAGACCAACCAAGAGGCCGAGCTGCAGGCCATCCACCTGGC  
 CCTCAGGACTCCGGCTCCGAGGTGAACATCGTGACCGACTCCAGTACGCCCTGGGCTATCCAGGCCAGCCCGACAAAGTCCGAGTCCGAGCTGGTGA  
 ACCAGATCATCAGCAGCTGATCCAGAAGGAGAAGGTGTACCTGTCTGGTGCCCGCCCAAGGGCATCGGCGGCAACGAGCAGGTGGACAAGCTGGTG  
 TCCGCGGCTCCGCAAGATCCTGTTCTGGACGGCATCGACAGGCCCCAGGAGGAGCAGAGAAGTACCAACAACCTGGCGGCCATGGCCCTCCGACTT  
 CAACCTGCCCCCGTGGTGGCCAAAGGATCGTGGCTTCTGGCCAAAGTGGCAGCTGAAGGGCGAGGCCATGCACGGCCAGGTGGACTGCTCCCCCGGCA  
 TCTGGCAGCTGGACTGCAACCACTGGAGGGCAAGATCATCTGTGTGGCGGTGCACTGGCTTCCGGCTACATCGAGGCCGAGGTGATCCCCCGCGAGACC  
 GGCCAGGAGACCGCCTACTTTCATCTTGAAGCTGGCCGGCGGTGGCCGCTGAAGATCATCCACACCGACAACGGCTCCAACCTCCCGCCCGCTGAA  
 GGCGGCTGTGTGGTGGCGGATCCAGCAGGAGTTCGGCATCCCTTACACCCCGAGTCCAGGGCGTGGTGGAGTCCATGAACAAGAGCTGAAGAAGA  
 TCATCGGCCAGGTGGCGGACCAAGCCGAGCACTGAAGACCCCGTGCAGATGGCCGTGTTCATCCACAACCTCAAGCGCAAGGGCGGCATCGGCGGCTAC  
 TCCGCGGCGAGCGCATCATCGACATCATCGCCACCGACATCCAGACCCCGGAGCTGCAGAAGCAGATCACCAAGATCCAGAACTTCCGGGTGTACTACCG  
 CGACTCCCGGACCCCGTGTGGAAAGGGCCCCGCAAGCTGTGTGAAGGGCGAGGGCGGCTGGTGTATCCAGGACAACCTCCGAGATCAAGGTGGTGGCCCC  
 CCGCAAGGCCAAGATCATCCGCGACTACGGCAAGCAGATGGCCGGCGCAGCTGCGTGGCCGGCCCGCCAGGACGAGGACTAA

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Fig. 115A

## 72. 2003 CON F2 pol. PEP

FFRENLAFOQGEAREFSSEQTRANSPASRELVRRRGDSPLPEAGAEQGTGSSLDFFQITLWQRPVLTIKVGGQREALLDTGADDTVLEDI  
 NLPKWKPKMIGGIGGFIKVRQYDQIPIEICGKAIGTVLGPFPVNIIGRNMLTQIGCTLNFPISPIETVPVKLPGMDGPKVKQWPLTEE  
 KIKALTEICTEMEKEGKISKIGPENPYNTPFAIKKDDSTKWRKLVDFRELNRKTQDFWEVQLGIPHPAGLKKKSVTVLDVGDAYFSVPLD  
 KEFRKYTAFTIPSTNNETPGIRYQYNVLPQGWKGSPIAFQSSMTKILEPFRKKNPEIIVYQYMDLTVGSDLEIGQHRTKIEELREHLLRWG  
 FTTPDKKHQKEPFLWMGYELHPDKWTVQAIQLPKSSWTVDIQLVGKLNWASQIYPGIRVKHLCKLLRGAKALTDVVPILTAAEAELELAE  
 NREILKEPVHGVYDPSKDLIAEIQKQHDQWTYQIYQEPHKNLKTGYARRKSAHTNDVKQLTEVVQKIATEGIVWGVKVPKFRLP IQKET  
 WEIWWTEYWQATWIPWEFEVNTPPLVKLWYQLETEPIVGAETFYVDGAANRETKLGKAGYVTDGRQKVPLTETTNOKTELOAIHLALQDS  
 GSEVNIVTDSQYALGIIQAHPDKSESELVNQIIIEQLIQKERVYLSWVPAHKGIGGNEQVDKLVSTGIRKVLFLDGDIDKAQEEHEKYHSNWRA  
 MASDFNLPPVVAKEIVASCDKCOLKGEAMHGQVDCSPGIWQLDCTHLEGGKIIILVAVHVASGYIEAEVIPAETGQETAYFILKLAGRWPVKII  
 HTDNGSNFTSTVVKAACWWAGIQOEFGIPYNPQSQGVESMKNELKKIIGQVRDQAEHLKTAVQMAVFIHNFRRKGGIGGYSAGERIIDIIA  
 TDIQTKELQKQITKIQNFRVYFRDSRDPVWKGPALKLWKGEAVVIQDNNEIKVVPRRKAKIIRDYKGQMAGDDCVAGRQDED\$

Fig. 116A

## 73. 2003 CON G pol. PEP

FFRENLAFOQGEAREFSSEQTRANSPTRRELVRRRGDSPLPEAGAEKGASLSFPQITLWQRPVLTIKVGGQLEALLDTGADDTVLEIN  
 LPKWKPKMIGGIGGFIKVRQYDQIILIEISGKKAIGTVLGPFPINIIGRNMLTQIGCTLNFPISPIETVPVKLPGMDGPKVKQWPLTEEK  
 IKALTEICTEMEKEGKISKIGPENPYNTPIFAIAKKDDSTKWRKLVDFRELNRKTQDFWEVQLGIPHPAGLKKKSVTVLDVGDAYFSVPLDE  
 NFRKYTAFTIPSTNNETPGIRYQYNVLPQGWKGSPIAFQSSMTKILEPFRKKNPEIIVYQYMDLTVGSDLEIGQHRKIEELREHLLRWGF  
 TTPDKKHQKEPFLWMGYELHPDKWTVQPIQLPKESWTVDIQLVGKLNWASQIYPGIRVKQLCKLLRGAKALTDIVPILTAAEAELELAE  
 REILKEPVHGVYDPSKELIAEVQKQGLDQWTYQIYQEPYKNLKTGYAKRGSHTNDVKQLTEVVQKIATESIVWGTPTPKFLPIRKETW  
 EVWWTEYWQATWIPWEFEVNTPPLVKLWYRLTEPIPGAETYYVDGAANRETKLGKAGYVTDKGKQKIITLTETTNOKAELOAIHLALQDSG  
 SEVNIVTDSQYALGIIQAOPDRSESELVNQIIIEQLIKKEKVVYLSWVPAHKGIGGNEQVDKLVSSGIRKVLFLDGDIDKAQEEHEKYHSNWRA  
 ASDFNLPPIVAKKEIVASCDKCOLKGEAMHGQVDCSPGIWQLDCTHLEGGKIIILVAVHVASGYIEAEVIPAETGQETAYFILKLAGRWPVKVIH  
 TDNGSNFTSAAVKAACWWANITQOEFGIPYNPQSQGVESMKNELKKIIGQVRDQAEHLKTAVQMAVFIHNFRRKGGIGGYSAGERIIDIIAS  
 DIQTKELQKQITKIQNFRVYFRDSRDPVWKGPALKLWKGEAVVIQDNNEIKVVPRRKAKIIRDYKGQMAGDDCVAGRQDED\$

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## Fig. 116B

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TTCTTCGGGAGAACCTGGCCTTCCAGCAGGGCGAGGCCGGAGTTCTCTCCGAGCAGGCCCGCCCAACTCCCCACCCGCCGAGCTGCGCGTGCG  
CCGGGGGACTCCCCCTGCCCCGAGGCCGAGGCCGCGCTCCCTGTCTTCCCCAGATCACCTGTGGCAGCGCCCCCTGGTGACCG  
TGAAGATCGCGGCCAGCTGATCGAGGCCCTGTGACACCGGCCCGACGACCCGTGCTGGAGGAGATCAACCTGCCCGGCAAGTGAAGCCCAAGATG  
ATCGCGGCATCGCGGCTTTCATCAAGTGGCCAGTACGACAGATCCTGATTCGAGATCTCCGCAAGAAGGCCATCGGCACCGTGTGGTGGCCCCAC  
CCCCATCAACATATCGCGCCGCAACATGCTGACCCAGATCGGTGACCCCTGAACCTTCCCCATCTCCCCATCGAGACCGTCCCGTGAAGCTGAAGCCCCG  
GCATGGACGGCCCCAAGTGAAGCAGTGGCCCCCTGACCGAGGAGAGATCAAGGCCCTGACCGGATCTGACCGAGATGGAGAAGGAGGCAAGATCTCC  
AAGATCGGGCCCCGAGAACCCCTACAACACCCCATCTTCGCATCAAGAAGAGGACTCCACCAAGTGGCGCAAGCTGGTGGACTTCCCGGAGCTGAACAA  
GCGACCCAGGACTTCTGGGAGGTGAGCTGGGCATCCCCACCCCGCGGCTGAAGAAGAAAGTCCGTGACCGTGTGGACGTGGCGGACGCGCTACT  
TCTCCGTGCCCTGGACGAGAACTTCCGCAAGTACACCGCTTACCATCCCCCTCCACCAACACGAGACCCCCGGCATCCGCTACCACTACCAACGTGTG  
CCCCAGGGCTGGAAGGGCTCCCCCGCCATCTTCAGTCTTCCATGACCAAGATCCTGGAGCCCTTCCGACCAAGAACCCCGAGATCGTGATCTACCA  
CATGGACGACCTGTACGTGGGCTCCGACCTGGAGATCGGCCAGCACCGGCCAAGATCGAGGAGCTGCGCGAGCACCTGCTGCGTGGGCTTACCAACCC  
CCGACAAAGACCAAGAGGAGCCCCCTTCTGTGGATGGGTACGAGCTGCACCCCGACAAAGTGGACCGTGCAGCCCATCCAGCTGCCCGACAAAGGAG  
TCCTGGACCGTGAACGACATCCAGAAGCTGGTGGCAAGCTGAACGAGTGAAGCTGACCGAGGTGGTGCAGAAGATCGCCACCGAGTCCATCGTGATCTGGGGCAA  
CGGCGCAAGGCCCTGACCGACATCGTGCCCTGACCCCGGAGCGGAGCTGGAGCTGGCCGAGAACCGGAGATCTTGAAGGAGCCCGTGACCGCGGTG  
ACTACGACCCCTTCAAGGAGCTGATCGCCGAGGTGCAGAAGCAGGGCTTGACCAAGTGGACCTACAGATCTACGAGAGCCCTACAAGAACTGAAGACC  
GGCAAGTACGCCAAGCGGGCTCCGCCACACCAACGACGTGAAGCAGTGAAGCTGACCGAGGTGGTGCAGAAGATCGCCACCGAGTCCATCGTGATCTGGGGCAA  
GACCCCAAGTTCAGCTGCCATCCGCAAGGAGACCTGGAGGTGTGGTGGACCGAGTACTGGCAGGCCACCTGGATCCCCGAGTGGGAGTTCGTGAACA  
CCCCCCCCCTGTTGAAGCTGTGTACCGCTGGAGACCGAGCCCATCCCCGGGCGCGAGACCTACTAGTGGACGGCGCGCCCAACCGGAGACCAAGCTG  
GGCAAGGCCGGCTACGTGACCGACCAAGGCAAGCAGAAGATCATACCTGACCGAGACCAACCAAGAGGCCGAGCTGCAGGCCATCCACCTGGCCCT  
GCAGGACTCCGGCTCCGAGGTGAACATCGTGACCGACTCCAGTACGCCCTGGGCATCATCCAGGCCCGCCGACCGCTCCGAGTCCGAGCTGGTGAACC  
AGATCATCGAGCAGCTGATCAAGAAGGAGAAGTGTACTCTGTCTGGTGGCCGTCACGTGGCTCCGGCTACATCGAGGCCGAGGTGATCCCCCGCGAGACCGGC  
TCCGGCATCCGCAAGTGTCTTCTGGACGGCATCGACAAGGCCAGGAGGAGCACGAGCGCTACCACTCCAAGTGGCGGCCATGGCTCCGACTTCAA  
CCTGCCCCCATCGTGGCCAAAGGAGATCGTGGCTCTCTGCGACAAGTGCAGCTGAAGGCGAGGCCATGCACGGCCAGGTGGACTGCTCCCCCGGCATCT  
GGCAGTGGACTGCACCCACCTGGAGGGCAAGATCATCTGTGTGGCCGTGACGTGGCTCCGGCTACATCGAGGCCGAGGTGATCCCCCGCGAGACCGGC  
CAGGAGACCGCTACTTCTATCTGAAGCTGGCCCGCGCTGGCCCGTGAAGGTGATCCACACCGACACCGCTCAACTTCACTCCGCCCGCGTGAAGGC  
CGCTGCTGGTGGGCCAATCAACAGGAGTTCGGCATCCCCCTACAACCCCGAGTCCAGGGCGTGGTGGAGTCCATGAACAAGGAGCTGAAGAAGATCA  
TCGGCCAGGTGGCGACCGAGCCGAGCACCTGAAGACCGCGGTGAGATGGCCGTGTTATCCACAACCTCAAGCGCAAGGGCGGCATCGGCGGCTACTCC  
GCCGCGAGCGCATCATCGACATCATCGCTCCGACATCCAGACCAAGGAGCTGCAGAAGCAGATCACCAAGATCCAGAACTTCCGGGTGTACTACCGGA  
CTCCCGGACCCCATCTGGAAGGGCCCCCGCAAGCTGTGTGGAAGGGCGGCGCGTGGTGTATCCAGGACAAACACGAGATCAAGGTGGTGGCCCCGCC  
GCAAGGCCAAGATCATCCCGGACTACGGCAAGCAGATGGCCGGCGCGCCGAGGACGAGGACTAA

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Fig. 117A

## 74. 2003 CON H pol. PEP

FFRENLAQQREARKFSPEQARANSPTSRELVRRGDDPLSEAGAEGQTSLSFPQITLWQRPVTVVKIEGQIREALLDTGADDTVLEEINL  
 PGKWKPKMIGGIGGFIKVRQYEQVAIEICGKKAIGTVLVGPTPVNIIGRNILTOIGCTLNFPISPIETVPVKLPGMDGPKVKQWPLTEEKI  
 KALTEICIEMEKEGKISKIGPENPYNTPIFAIKKDKSTKWRKLVDFRELNKRTOQDFWEVQLGIPHAGLKKKKSVSVDVGDAYFSVPLDKD  
 FRKYTAFTIPSINNETPGIRYQYNVLPQGWKGSFAIFQSSMTKILEPFRKQNPENIYYQYMDDLVYVGSDEIGQHRAKIEELRAHLLRWGFT  
 TPDKKHQKEPPFLWGYELHPDKWTVPVKLPEKDSWTVNDIQKLVKLNWASQIYPGKVKQCKLLRGAKALTDIVPLTKEAELELEAENR  
 EILREPVHGVYDPSKDLIAEIQKQPDQWTYQIYQEPFKNLTKGYAKMRTAHTNDVKQLTEAVQKIATESIVIWGKIPKFRLPQKETWE  
 TWTEHWQATWIPWEFVNTPHLVKLWYQLETEPIAGAEYYVDGAANRETKIGKAGYVTDRGKQKVVSLETETTNQKTELQAIYALQDSGL  
 EVNIVTDSQYALGIIQAQPDKSESELVNOIEELIKKEKVVLSWVPAHKGIGGNEQVDKLVSSGIRKVLFLDGDIDKAQEEHERYHNNWRAMA  
 SDFNLPIVAKEIVASCDCQKLGAMHGQVDCSPGIWQLDCTHLEGKVLVAVHVASGYIEAEVIPAETGQETAYFILKLGRWPVKMIHT  
 DNGSNFTSAAVKAACWADIQOEFGIPYNPQSQGVVESMNKELKKIIGQVRDQAEHLRTAVQMAVFIHNFKRKGGIGGYSAGERIIDIIATD  
 IQTKELQKQISKIQFRVYRDSRDPWKGPAKLLWKGEAVVIQDNSEIKVVPRRKAKIIRDYKQKQMGAGDDCVAGRQDED\$

Fig. 118A

## 75. 2003 CON 01 AE pol. PEP

FFRENLAQQQKAGEFSSEQTRANSPTSRLKLGDDGRDNLITEAGAEQGTSSSFPPQITLWQRPVTVVKIEGQIREALLDTGADDTVLEDI  
 NLPKGWKPKMIGGIGGFIKVRQYDQILIEICGKKAIGTVLVGPTPVNIIGRNMLTQIGCTLNFPISPIDTVPVTLKPGMDGPKVKQWPLTEE  
 KIKALTEICKEMEEEGKISKIGPENPYNTPVFAIKKDKSTKWRKLVDFRELNKRTOQDFWEVQLGIPHAGLKKKKSVSVDVGDAYFSVPLD  
 ESFRKYTAFTIPSINNETPGIRYQYNVLPQGWKGSFAIFQSSMTKILEPFRKKNPEMVIYQYMDDLVYVGSDEIGQHRKIEELRAHLLSWG  
 FTTPDKKHQKEPPFLWGYELHPDRWTVQPIELPEKDSWTVNDIQKLVKLNWASQIYAGIKVKQCKLLRGAKALTDIVPLTEEALELEAE  
 NREILKTPVHGVYDPSKDLVAEVQKQGDQWTYQIYQEPFKNLTKGYARKRSATNDVRQLTEVVQKIATESIVIWGKTPKFRLPQIRET  
 WETWMEYWQATWIPWEFVNTPPLVKLWYQLEKDPVGAETFYVDGAASRETKLGAGYVTDGRQKVVSLETETTNQKTELHAIHLALQDS  
 GSEVNIVTDSQYALGIIQAQPDRESESEVNVQIIEELIKKEKVVLSWVPAHKGIGGNEQVDKLVSSGIRKVLFLDGDIDKAQEEHERYHNSWRT  
 NASDFNLPIVAKEIVANCDCQKLGAMHGQVDCSPGIWQLDCTHLEGKVLVAVHVASGYIEAEVIPAETGQETAYFLLKLGRWPVKVI  
 HTDNGSNFTSAAVKAACWAWANVRQEFGIPYNPQSQGVVESMNKELKKIIGQVREQAEHLKTAVQMAVFIHNFKRKGGIGGYSAGERIIDIIA  
 TDIQTKELOKQITIKQIFRVYRDSRDPWKGPAKLLWKGEAVVIQDNSEIKVVPRRKAKIIRDYKQKQMGAGDDCVAGRQDED\$



**Fig. 117B**

2003\_CON\_H pol.OPT

TTCTTCCGGAGAACTTGGCCTTCCAGCAGCGCGAGGGCCCGCAAGTTCTCCCCCGAGCAGGCCCGCGCCAACCTCCCCCACTCCCCCACTCCCCCGAGCTCGCGGTGGC  
CCGGGGGACGACCCCCCTGTCCGAGCGCGCGCGAGGGCCAGGGCACTTCCCTGTCTTCCCCCAGATCACCTGTGGCAGCGCCCCCTGGTGACCGTGA  
AGATCGAGGGCCAGCTGCGCAGGCCCTGTGGACACCGCGCCACGACACCGTGTGGAGGAGATCAACCTGCCCGCAAGTGAAGCCCAAGATGATC  
GGCGCATTCGGCGGCTTCATCAAGGTGCGCCAGTACGAGCAGGTGGCCATCGAGATCTGGGCAAGAGCCATCGGCACCGTGTGGTGGCCCCCACCC  
CGTGAACATCATCGGCCGCAACATCTGACCCAGATCGGCTGCACCTGAATTCGCCATCTCCCCCATCGAGACCGTGCCTGAACTGAAGCTGAAGCCCCGGCA  
TGGACGGCCCCAAGTGAAGCAGTGGCCCCCTGACCGAGGAGAAGATCAAGGCCCTGACCGAGATCTGCATCGAGATGGAGAAGGAGGCAAGATCTCCAAG  
ATCGGCCCCGAGAACCCCTACAACACCCCCCATCTTCGCCATCAAGAAGGACTCCACCAAGTGGCGCAAGCTGGTGGACTTCGCGGAGCTGAACAAGCG  
CACCCAGGACTTCTGGGAGGTGCAGTGGGCATCCCCACCCCGCGCTGAAGAAAGTCCGTGTCCGTGCTGGACGTGGCGGACCGCTACTTCT  
CCGTGCCCCGTGACAAAGGACTTCGCAAGTACACCGCTTACCATCCCCTCATCAACAACGAGACCCCCCGCATCCGCTACCACTACAACGTGCTGCCCC  
CAGGGCTGAAGGGCTCCCCCGCCATCTTCCAGTCTTCCATGACCAAGATCTTGAGCCCTTCCGCAAGCAGAACCCGAGATGATCATCTACCAGTACAT  
GGACGACCTGTACGTGGCTCCGACCTGGAGATCGGCCAGCACCGGCCCAAGATCGAGGAGTGGGGCCACCTGCTGCGTGGGGCTTCAACACCCCCG  
ACNAGAAGCACCAAGAGGACCCCCCTTCTGTGGATGGGTACGAGCTGCACCCCGACAAGTGGACCGTGCAGCCCCGTGAAGCTGCCCGAGAAGGACTCC  
TGGACCTGTAACGACATCCAGAAGCTGGTGGGCAAGCTGAATGGGCTTCCAGATCTACCCCGGCATCAAGGTGAAGCAGCTGTGCAAGCTGCTGCGCGG  
CGCAAGGCCCTGACCGACATCGTGGCCCTGACCAAGGAGGCCGAGCTGGAGCTGGCCGAGAACCGCGAGATCTCGAGATCTACAGAGCCCTTCAAGAACCTGAAGACCGGG  
ACGACCCCTCAAGGACCTGATCGCCGAGATCCAGAAGCAGGGCCCCGACCAAGTGGACCTGCGAGAGATCGCCACCGAGTCCATCGTGATCTGGGGCAAGAT  
AAGTACGCAAGATGCGCACCGCCCAACCAACGACGTGAAGCAGCTGACCGAGGCCGTGCAGAAGATCGCCACCGAGTCCATCGTGATCTGGGGCAAGAT  
CCCCAAGTTCGCTGCCATCCAGAAGGAGACCTGGGAGACCTGGTGACCGGACACTGGCAGGCCACCTGGATCCCCGAGTGGGAGTTCTGTGAACACCCC  
CCACCTGGTGAAGCTGTGTACAGCTGGAGACCGAGCCCATCGCCGGCCGAGACCTACTACTGTGGACGGCGCCCAACCGGAGACCAAGATCGGG  
AAGGCCGGCTACGTGACCGACCGCGCAAGCAGAAGTGGTGTCCCTGACCGAGACCAACCAAGAGACCGAGCTGCAGGCCATCTACCTGGCCCTGCA  
GGACTCGGCCCTGGAGTGAACATCGTGAACCGACTCCAGTACGCCCTGGGCATCATCCAGGCCACCGCCGACAAGTCCGAGTCCGAGCTGGTGAACCA  
TCATCGAGGAGCTGATCAAGAAGGAAAGGTGTACCTGTCTTGGTGGCCGCCCAAGGGCATCGGGGCAACGAGCAGGTGACAAAGCTGGTGTCTCTCC  
GGCATCCGCAAGGTGCTGTCTGGACGGCATCGACAAGGCCCAAGGACCAAGTGCAGTGAAGGGCGAGGCCATGCACGGCCAGGTGGACTGCTCCCCGGCATCTGGC  
GCCCCCATCGTGGCCAAGGAGATCGTGGCCTCCTGCGACAAGTGCAGTGAAGGCCGTGACGTGGCCCTCGGCTACATCGAGGCCGAGGTGATCCCCCGGACCGGCCAG  
AGCTGGACTGCACCCACCTGGAGGGCAAGTGATCTGTGGCCGTGCACGTGGCCCTCGGCTACATCGAGGCCGAGGTGATCCCCCGCGAGACCGGCCAG  
GAGACCGCTACTTTCATCTTGAAGTGGCCGGCCGTGGCCGTGAAGATGATCCACACCGACAACGGCTCCAACTTCACCTCCGCGCGTGAAGGCCGC  
CTGTGTTGGGCCGACATCCAGCAGGAGTTCGGCATCCCCTACAACCCCAAGTCCAGGGCGTGGTGGAGTCCATGAACAAGGAGCTGAAGAAGATCATCG  
GCCAGGTGCGGACCGGCCGAGACCTGGCACCGGATCGGATGGCCGTGAGATGGCCGTGTTTCATCCACAACCTCAAGCGCAAGGGCGGCATCGGCGGCTACTCCGCC  
GGCAGCGCATCATCGACATCATCGCACCGACATCCAGACCAAGGAGCTGCAGAAGCAGATCTCCAAGATCCAGAAGTTCGCGGTGTACTACCGGACTC  
CCGACCCCCATCTTGAAGGGCCCCCGCAAGCTGCTGTGGAGGGCGAGGGCGCGTGGTGTCTCAGGACAACCTCCGAGATCAAGGTGGTGGTCCCCCGCGCA  
AGGCCAAGATCATCCGCGACTACGGCAAGCAGATGGCCGGCGGACGACTGCTGTGGCCGGCCCGCCAGGACGAGGACTAA





Fig. 119A

76. 2003 CON 02 AG pol. PEP

FFRENLAFOQGEARKFSSEQTGTNSPTSRLEWDGGRDNLSEAGTEGQGTISSFNFPQITLWQRPVTVRIGGQLEALLDTGADDTVLEEI  
 NLPKWKPKMIGGIGGFIKVRQYDQILIEICGKKAIGTVLVGPTPVNIIGRNMLTQIGCTLNFPISPIETVPVTLKPGMDGPKVKQWPLTEE  
 KIKALTDICTEMEKEGKISKIGPENPYNTPVFAIKKDDSTKWRKLVDFRELNKRTOQDFWEVOLGIPHPAGLKKKKSVTVLVDGDYFVSVPD  
 KDFRKYTAFTIPSVNNETPGIRYQYNVLPQGWKGSFAIFQASMTKILEPFTKNPEIIVIQYMDLLYVGSDDLEIGQHRAKIEELREHLLRWG  
 FTTDPKKHQKEPPFLWMGYELHPDKWTVPQIOLPEKDSWTVDNDIQKLVGKLNWASQIYAGIKVKQCLCKLLRGAKALTDIVTLTEEAEELELAE  
 NREILKEPVHGVYDPTKDLIAEIQKQGDQWTYQIYQEPFKNLKTGKYAKMRSATNDVKQLTEVVKVATESIVWGTPKFRLPIQRET  
 WEAWWMEYWQATWIPWEFVNTPLVLKWLWYQLEKDPVGAETFYVDGAANRETKLGKAGYVTDGRQKVVSLTETTNQKTELHAHHLALQDS  
 GSEVNIIVTDSQYALGIIQAQPDSESELVNQIEKLEKDKVYLSWVPAHKGIGGNEQVVDKLVSNIGIRKVLFLDGDIDKAOEHEHYHSNWRA  
 MASDFNLPPIVAKEIVASCDCQKLGAMHGQVDCSPGIWQLDCTHLEGKIILVAVHVASGYIEAEVIPAETGQETAYFILKLAGRWPVKVI  
 HTDNGSNFTSAVKAACWVANVTQEFFGIPYNPQSQGVVESMNKELKKIIGQVRDQAEHLKTAVQMAVFIHNFKRKGGIGGYSAGERIIDIIA  
 SDIQTKELQKQITKIIONFRVYRDSRDPWKGPAKLLWKGEAVVIQDNNDIKVVPRRKAKIIRDYKQGMAGDDCVASGRQDED\$

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Fig. 120A

77. 2003 CON 03 AB pol. PEP

FFRENLAFOQGEARKFSSEQTRAISPTSRKLDGGRDNLPLPETGTERQGTASSENFPQITLWQRPVTVRIGGQLEALLDTGADDTVLEDI  
 NLPKWKPKMIGGIGGFIKVRQYDQILIEICGKKAIGTVLVGPTPVNIIGRNMLTQIGCTLNFPISPIETVPVTLKPGMDGPKVKQWPLTEE  
 KIKALTDICTEMEKEGKISKIGPENPYNTPVFAIKKDDSTKWRKLVDFRELNKRTOQDFWEVOLGIPHPAGLKKKKSVTVLVDGDYFVSVPD  
 QDFRKYTAFTIPSVNNETPGIRYQYNVLPQGWKGSFAIFQSSMTKILEPFTKNPEIIVIQYMDLLYVGSDDLEIGQHRAKIEELREHLLRWG  
 FTTDPKKHQKEPPFLWMGYELHPDKWTVPQIOLPEKDSWTVDNDIQKLVGKLNWASQIYAGIKVKQCLCKLLRGAKALTEVIPLTAAEELELAE  
 NREILKEPVHGVYDPTKDLVAEIQKQGDQWTYQIYQEPFKNLKTGKYARLGAHTNDVKQLTEAVQKIATESIVWGTPKFRLPIQKET  
 WETWTEYWQATWIPWEFVNTPLVLKWLWYQLEKEPIVGAETFYVDGAANRETKSGKAGYVTDGRQKVVSLTDTTNQKTELQAIHLALQDS  
 GLEVNIVTDSQYALGIIQAQPDSESELVSQIEQLIKKEKVYLAWVPAHKGIGGNEQVVDKLVSAGIRKVLFLDGDIDKAOEAEHYHSNWRA  
 MASDFNLPPVVAKEIVASCDCQKLGAMHGQVDCSPGIWQLDCTHLEGKIILVAVHVASGYIEAEVIPAETGQETAYFVLKLAGRWPVKII  
 HTDNGSNFISTAVKAACWVAGIKQEFFGIPYNPQSQGVVESMNKQLKQIIGQVRDQAEHLKTAVQMAVFIHNFKRKGGIGGYSAGERIIDIIA  
 TDIQTKELQKQIIKIIONFRVYRDSRDPWKGPAKLLWKGEAVVIQDNNDIKVVPRRKAKIIRDYKQGMAGDDCVASGRQDED\$

## Fig. 119B

2003\_CON\_02\_AG\_pol.1.OPT

TTCTCCGCGAGAACCTGGCCTTCCAGCAGGGCGAGGCCCGCAAGTCTCCTCCGAGCAGACCGGCAACAACTCCCCACCTCCCGCGAGCTGTGGGACGG  
 CGCCCGGACAACTGTGTCCGAGCCCGGACCGAGGGCCAGGGCAACCATCTCTCTTCAACTTCCCCAGATCACCTGTGGCAGCGCCCCCTTGGTGA  
 CCGTGGCATCGGGGCCAGCTGATCGAGGCCCTGTGGACACCGGGCCGACGACACACCTGTGGAGAGATCAACCTGCCCGCAAGTGAAGCCCAAG  
 ATGATCGCGGCATCGGGGCTTCATCAAGGTGCGCCAGTACGACCAAGATCTGATCGAGATCTCGGCAAGAGGCCCATCGGCACCGTGTGGTGGCCCC  
 CACCCCGTGAACATCATCGGCCGCAACATGTCACCCAGATCGGCTGCACCTGAATTCCTCCCATCGAGACCGTGCCTGCTGAGTGAAGTGAAGC  
 CCGCATGGACGGCCCCAAGTGAAGCAGTGGCCCCCTGACCGAGGAGAAGATCAAGGCCCTGACCGACATCTGCACCGAGATGGAGAAGGAGGCAAGATC  
 TCCAAGATCGGGCCCCGAGAACCCCTACAACACCCCGTGTTCGCCATCAAGAAGAGGACTCCACCAAGTGGCGCAAGCTGGTGGACTTCCGCGAGCTGAA  
 CAGCGCACCCAGGACTTCTGGGAGGTGCAGCTGGGATCCCCACCCCGCGGCTGAAGAAGAAGAACTCCGTGACCGTGTGGAGCTGGGCGACGCT  
 ACTTCTCCGTGCCCCGTGACAAAGGACTTCCGCAAGTACACCGCTTCAACATCCCCCTCCGTGAACACGAGACCCCCCGGCATCCGCTACAGTACAACGTG  
 CTGCCCCAGGGCTGGAAGGCTCCCCCGCATCTTCCAGGCCCTCCATGACCAAGATCTCTGGAGCCCTTCGCAACCAAGAACCCCGAGATCGTGATCTACCA  
 GTACATGGACGACCTGTACGTGGGCTCCGACCTGGAGATCGGCCAGCACCGCGCCAAGATCGAGGAGCTGGCGAGCACCTGTGCGTGGGCTTCACCA  
 CCCCCGACAAAGCACCAAGAGGAGCCCCCTTCTGTGTGATGGGTACGAGCTGACCCCGACAAGTGGACCGTGCAGCCCATCCAGTGCCTCGAGAGAG  
 GACTCTGGACCGTGAACGACATCCAGAAGCTGTGGGCAAGCTGAATGGGCTCCAGATCTACCGCGCATCAAGGTGAAGCAGCTGTGCAAGCTGCT  
 GCGGGCGCCAAAGGCCCTGACCGACATCGTGACCTTGACCGAGGCGCGAGCTGGAGCTGGCCGAGAACCGCGAGATCTCTGAAGGAGCCCGTGCACGGCG  
 TGTACTACGACCCCAACCAAGGACCTGATCGCCGAGATCCAGAAGCAGGGCCAGGACCACTGGACCTACAGATCTACAGGAGCCCTTCAAGAACCTGAAG  
 ACCGGCAAGTACGCCCAAGATGCGCTCCGCCACACCAACGACGTGAAGCAGCTGACCGAGGTGTGCAGAAGTGGCCACCGAGTCCATCGTGATCTGGGG  
 CAAGACCCCCAAGTTCGGCTGCCATCCAGCGCGAGACCTGGGAGGCTGGTGAAGTACTGGCAGGCCACCTGGATCCCCGAGTGGGAGTTCGTGA  
 ACACCCCCCTGGTGAAGCTGTGGTACCAGCTGGAGAGGACCCCATCGTGGGCGCCGAGACCTTCTACGTGGACGGCGGCCCAACCGCGAGACCAAG  
 CTGGGCAAGGCCGGCTACGTGACCGACTCCAGTACGCCCTGGGCATCATCCAGGCCAGCCCGACCCAGAACAGACCGAGCTGCACGCCATCCACCTGGC  
 CCTGCAAGACTCCGGCTCCGAGGTGAACATCGTGACCGACTCCAGTACGCCCTGGGCATCATCCAGGCCAGCCCGACCCGCTCCGAGTCCGAGTGGTGA  
 ACCAGATCATCGAAGAGTGCAGAGGACAAAGTGTACTGTCTGGTGCCGCCCAAGGGCATCGGGCGCAACGAGCAGGTGGACAAGTGGTG  
 TCCAACGGCATCCGCAAGTGTCTCTGGACGGCATCGACAAGGCCCAAGGAGGACGAGCGCTACCACTCCAATGGCGGCCCATGGCTCCGACTT  
 CAACCTGCCCCCATCGTGGCCAAGGAGATCGTGGCTCTCGGACAAAGTGGCAGCTGAAGGGCGAGGCCCATGACGGGCCAGGTGGACTGCTCCCCCGGCA  
 TCTGGCAGCTGGACTGCACCCACCTGGAGGGCAAGATCATCTGTGTGGCGTGACGTGGCTCCGGCTACATCGAGGCCGAGGTGATCCCCCGCGAGACC  
 GGCCAGGAGACCGCTACTTCTATCTGAAGTGGCCGCGCTGGCCGTGAAGTGTCCACACCGACAAACGGCTCCAATTCACCTCCGCCCGCGTGAAG  
 GGGCCCTGTGTGGGCCAACGTGACCCAGGAGTTCGGCATCCCTACAAACCCAGTCCAGGGCGTGGTGAAGTCCATGAACAAGGAGTGAAGAAGA  
 TCATCGGCCAGGTGCGGCACAGGCCGAGCACCTGAAGACCGCGCTGCAGATGGCGGTGTTCATCCACAACCTTCAAGCGCAAGGGCGGCATCGGGCGGTAC  
 TCCGCGCGGAGCGCATCATCGCATCATCGCTCCGACATCCAGACCAAGGAGCTGCAGAAGCAGATCACCAAGATCCAGAACCTCCGCGGTGTACTACCG  
 CGACTCCCCGCAACCCCATCTGGAAGGGCCCCGCAAGCTGTGTGGAAGGGCGAGGGCGCGTGGTGTATCCAGGACAACTCCGACATCAAGGTGGTGGCCCC  
 GCGCAAGGCCAAGATCATCCCGCATACGGCAAGCAGATGGCCGGCGAGCTGCGTGGCGGCCCGCCAGGACGAGGACTAA

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## Fig. 120B

2003\_CON\_03\_AB\_pol.OPT

TTCTTCCGCGAGAACCTGGCCTTCCAGCAGCGGAGGCCCGCAAGTTCTCTCCGAGCAGACCCGCGCCCATCTCCCCACCTCCCGCAAGCTGTGGGACGG  
 CGGCCGCGACAACCCCTGCCCCGAGACCCGGCACCGAGCGCCAGGCAACCCCTTCAACTTCCCCAGATCACCTGTGGCAGCGCCCCCTGGTGA  
 CCGTGGCGCATCGGCGCGCAGCTGAAGGAGGCCCTGTGTGACACCGGCGCGACACCCGCTGCTGGAGGACATCAACCTGCCCGGCAAGTGAAGCCCAAG  
 ATGATCGGCGGCATCGGCGGCTTTCATCAAGGTGCGCCAGTACGACCAAGATCCTGATCGAGATCTGCGGCAAGAGGCCATCGGCACCCGTGCTGTGGGCCCC  
 CACCCCGTGAACATATCGGCGCGCAACATGCTGACCCAGCTGGCTGCAACCTGAACTTCCCCATCTCCCCATCGAGACCGTGGCCCGTGAACCTGAAGC  
 CCGGCATGGACGGCCCCAAGGTGAAGCAGTGGCCCCCTGACCGGAGGAGATCAAGGCCCTGACCGCATCTGAAGGAGATGGAGAGGAGGGCAAGATC  
 TCCAAGATCGGCCCCCGAGAACCCCTACAACACCCCGCTGTTCGCCATCAAGAAGAAGGACTCCACCAAGTGGCGCAAGCTGGTGGACTTCCGCGAGCTGAA  
 CAAGCGACCCAGGACTTCTGGGAGGTGCAGTGGGCATCCCCACCCCGCGGCTGAAGAAGAAGTCCGTGACCTGCTGGACGTGGGGCAGCGCT  
 ACTTCTCCGTGCCCTGGACCAAGGACTTCCGCAAGTACACCGCTTACCATCCCTCCACCAACGAGACCCCGGCATCCGCTACCAACGTA  
 CTGCCCCAGGGCTGAAGGGCTCCCCCGCCATCTTCAGTCTCCATGACCAAGATCCTGGAGCCCTTCCGCAAGCAGAACCCCGAGATCGTGTATCTACCA  
 GTACATGGACGACTGTACGTGGGCTCCGACCTGGAGATCGGCCAGCACCGCACCAAGATCGAGGAGCTGGCGGAGCACCTGTGCTGGCTGGGGCTTCAACCA  
 CCCCAGACAAGACACCAAGAGGAGCCCCCTTCTGTGGATGGGTACGAGTGCACCCCGACAAGTGGACCGTGCAGCCCATCGTGTGCCCGAGAAG  
 GACTCTGGACCGTGAACGACATCCAGAAGCTGGTGGCAAGCTGAACCTGGGCCCTCCAGATCTACGCCGCATCAAGGTGGCGCAGCTGTGCAAGCTGCT  
 GCGCGCGCAAGGCCCTGACCGAGGTGATCCCCCTGACCGCGAGCGGAGCTGGAGCTGGCCGAGAACCGCGAGATCCTGAAGGAGCCCGTGCACGGCG  
 TGTACTACGACCCCTCCAAGGACCTGGTGGCCGAGATCCAGAAGCAGGGCCAGGGCCAGTGGACCTACCAGATCTACCAGAGCCCTTCAAGAACCTGAAG  
 ACCGCAAGTACGCCCGCTGCGCGCGCCACACCAAGCAGTGAAGCAGTGAACCGAGGCCGTGCAGAAGATCGCCACCGAGTCCATCGTGTATCTGGGG  
 CAAGACCCCAAGTCAAGCTGCCATCCAGAAGGAGACCTGGGAGACCTGGTGGACCGAGTACTGGCAGGCCACCTGGATCCCCGAGTGGGAGTTCTGTGA  
 ACACCCCCCTGGTGAAGCTGTGGTACCAGCTGGAGAAGGAGCCCATCGTGGCGCGCGAGACCTTCTACGTGGACGGCGCGCCAAACCGCGAGACCAAG  
 TCCGGCAAGGCCCGCTACGTGACCGACCGCGCGCCCGCAGAAAGTGTGTCTGACCGACACCAACCAAGAGACCGAGCTGCAGGCCATCCACCTGGC  
 CCTGCAGGACTCCGGCTGGAGGTGAACATCGTGACCGACTCCAGTACGCCCTGGGCATCATCCAGGCCAGCCCGACAAGTCCGAGTCCGAGCTGGTGT  
 CCCAGATCATCGAGCAGCTGATCAAGAAGGAGAAGGTGTACTTCTGGACGGCATCGACAAAGGCCCGAGAGGCCACGAGAAGTACCACCTCAACTGGCGCGCCATGGCCCTCCGACTT  
 TCCGCCGGCATCCGCAAGGTGCTGTTCTGGACGGCATCGACAAAGGCCCGAGAGGCCCGACGAGAAGTACCACCTCAACTGGCGCGCCATGGCCCTCCGACTT  
 CAACCTGCCCGCTGGTGGCCCAAGGAGATCGTGGCCCTCTTGGCAAAAGTGGCAGCTGAAGGCGAGGCCATGCACGGCCAGGTGGACTGCTCCCCCGGCA  
 TCTGGCAGCTGGACTGCACCCACCTGGAGGGCAAGATCATCTGTGTGGCGGTGCAAGTGGCCCTCCGGCTACATCGAGGCCGAGGTGATCCCCCGCGAGACC  
 GGCCAGGAGACCCCTACTTCTGTGAAGCTGGCCGCTGGCCGCTGAAGATCATCCACACCGACAACGGCTCCAACTTCATCTCCACCGCCGCTGAA  
 GCGCGCTGTGTGGGCGCGCATCAAGCAGGAGTTCGGCATCCCTTACACCCCGAGTCCAGGGCGTGGTGGAGTCCATGAACAAGCAGCTGAAGCAGA  
 TCATCGGCCAGGTGGCGGACCGAGCCGAGACCTGAAGACCGCCGTGCAGATGGCCGTGTTTCATCCACAACCTCAAGCGCAAGGGCGGCATCGGCGGGCTAC  
 TCCGCCGCGAGCGCATCATCGACATCATCGCCACCGACATCCAGACCAAGGAGCTGCAGAAGCAGATCATCAAGATCCAGAATCTCCGGCTGTACTACCG  
 CGACTCCCGCGACCCCATCTGGAAGGGCCCCCGCAAGCTGTGTGAAGGGCGAGGGCGCGCTGTGTATCCAGGACAACAACGACATCAAGGTGGTGGCCCC  
 CCGCAAGGCCCAAGATCATCCGCGGACTACGGCAAGCAGATGGCCGCGCAGCAGTGGCTGGCCCTCCCGCCAGGACGAGGACTAA

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Fig. 121A

78. 2003 CON 04 CPX pol. PEP

FFRENVAFQOREARKEFSSEQARANSPPARRELDERGDNLLSEAGTEGQGTISFNFPQITLWQRPVLVTIKIGGQIREALLDTGADDTVLEEIN  
 LPGAQPKMIGGIGGFIKVRQYDQIPIEICGKKAIGTVLVGPTPVNIIGRNMLTQIGCTLNFPISPIETVPVKLPGMDGPKVKQWPLTEEK  
 IKALTEICTEMEKEGKISKIGPENPYNTPIFAIAKKKNSTRWRKLVDFRELNRKTQDEWEVQLGIPHPAGLKKKSVTVLDVGDAYFSVPLDP  
 EFRKYTAFTIPSTNNETPGIRYQYNVLPQGWKGSPIAFCQSMKILEPFRKTNPEIYIYQYMDLTVGSDLEIGQHRAKIEELREHLLRWGF  
 STPDKKHQKEPPFLWMGYELHPDKWTVQPIQLAEKDSWTVNDIQLVGKLNWASQIYPGKVKQLCKLLRGAKALTDIVPLTTEAELELAEN  
 REILKEPVHGYYDPSKDLIAEIQKQGQGWTYQIYQEPYKNLKTGKYAKTRSAHTNDVRQLTEAVQKIAMECIVIWGKTPKFRLP IQKETW  
 DTWTEYWQATWIPWEFVNTPLVLWYQLETDPIAGAEYFVDGAASRETQKGAGYVTDGRQKVVSLSSETTNQKTELQAIYLAQDSG  
 SEVNIIVTDSQYALGIIQAQPKSESELVNOIIEQLIQDKVYLSWVPAHKGIGGNEQVDKLVNSGIRKVLFLDGDIDKAQEEHEKYHNNWRAM  
 ASDENLPPVVAKEIVASCNKCQLKGEAMHGQVDCSPGIWQLDCTHLEGGKIIILVAVHVASGYIEAEVIPAETGQETAYFILKLAGRWPVKIIH  
 TDNGSNFTSAAVKAAACWWADIQOEFPIPNPQSGVVESEMNKELKKIIGQVRDQAEHLKTAVQMAVFIHNFRRKGIGGYSAGERIIDIIAS  
 DIQTKELQKQITKIQNFRVYYRDSRDPWKGPAKLLWKGEAVVIQDNSDIKVVPRRKAKIIRDYKQMGAGDDCVAGRQDED\$

Fig. 122A

79. 2003 CON 06 CPX pol. PEP

FFRENLAFOQGEAREFSSEQARANSPTTRELVRRGDSPLEAGAGQGGAISLSEFPQITLWQRPVLVTIRIGGQILEALLDTGADDTVLEDIN  
 LPGAQPKMIGGIGGFIKVRQYDQIPIEICGKKAIGTVLVGPTPVNIIGRNMLTQIGCTLNFPISPIETVPVKLPGMDGPKVKQWPLTEEK  
 IKALTEICTEMEKEGKISKIGPENPYNTPIFAIAKKKDKTKWRKLVDFRELNRKTQDEWEVQLGIPHPAGLKKKSVTVLDVGDAYFSVPLDE  
 DFRKYTAFTIPSTNNETPGIRYQYNVLPQGWKGSPIAFCQSMKILEPFRKTNPEIYIYQYMDLTVGSDLEIGQHRAKIEELREHLLRWGF  
 TTPDKKHQKEPPFLWMGYELHPDKWTVQPIQLPDKDSWTVNDIQLVGKLNWASQIYPGKVKQLCKLLRGAKALTDIVPLTAEAELELAEN  
 REILKEPVHGYYDPSKDLIAEIQKQGQGWTYQIYQEPHKNLKTGKYARIKSAHTNDVKQLTEAVQKIALESIVIWGKTPKFRLP IQKETW  
 ETWTEYWQATWIPWEFVNTPLVLWYQLETEPIVGAETFYVDGAANRETQKKGAGYVTDGRQKVVSLSSETTNQKTELQAINLALQDSG  
 SEVNIIVTDSQYALGIIQAQPKSESELVNOIIEQLIKKEKVYLSWVPAHKGIGGNEQVDKLVSTGIRKVLFLDGDIDKAQEDHERYHSNWRAM  
 ASDENLPPVVAKEIVASCNKCQLKGEAMHGQVDCSPGIWQLDCTHLEGGKIIILVAVHVASGYIEAEVIPAETGQETAYFILKLAGRWPVKVIH  
 TDNGSNFTSAAVKAAACWWANITQOEFPIPNPQSGVVESEMNKELKKIIGQVRDQAEHLKTAVQMAVFIHNFRRKGIGGYSAGERIIDIIAS  
 DIQTKELQKQITKIQNFRVYYRDSRDPWKGPAKLLWKGEAVVIQDNSEIKVVPRRKAKIIRDYKQMGAGDDCVAGRQDED\$

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## Fig. 121B

2003\_con\_04\_cpx pol. OPT

TTCTTCGCGAGAACGTGGCCTTCCAGCAGCGGAGGCCCGCAAGTTCTCTCCGAGCAGGCCCCGGGCCAACTCCCCCGCCCCCGCGGAGCTGCGCGACGA  
 GCGCGCGACAACTGCTGTCCGAGGCGCGCACCGAGGGCCAGGCAACCATCTCCTTCAACTTCCCCCAGATCACCTGTGGCAGCGCCCCCTGGTGACCA  
 TCAAGATCGCGCGCCAGATCCGCGAGGCCCTGCTGGACACCGCGCCGACACCGTGTGGAGGAGATCAACCTGCCGGAAGTGGAAGCCCAAGATG  
 ATCGCGGCATCGCGGGCTTCAACAAGTGGCCAGTACGACAGATCCCCATCGAGATCTCGGCAAGAAGGCCATCGGCACCGTGTGTGGGCCCCAC  
 CCCCCGAAACATCATCGCGCGCAACATGCTGACCCAGCTGGGCTGACCCCTGAACCTGCCATCTCCCCCATCGAGACCGTGGCCGTGAAGCTGAAGCCCCG  
 GCATGGACGGCCCCAAGTGAAGCAGTGGCCCCCTGACCGAGGAGAAGATCAAGGCCCTGACCGAGATCTGCACCGAGATGGAGAAGGAGGGCAAGATCTCC  
 AAGATCGGCCCCGAGAAACCCCTACAAACCCCCCATCTTCGCCATCAAGAAGAACTCCACCCGCTGGCGCAAGCTGGTGACTTCCGCGAGCTGAACAA  
 GCGCACCCAGGACTTCTGGAGGTGCAGCTGGGCATCCCCACCCCGCGGCTGAAGAAGAAAGTCCGTGACCGTGGACGTGGCGGACGCCCTACT  
 TCTCCGTGCCCTGGACCCCCAGTTCGCAAGTACACCGCCTTACCATCCCCCTCCACCAACAACGAGACCCCCCGGCATCCGCTACCAATCAACAGTGTG  
 CCCAGGGCTGGAAGGGCTCCCCCGCCATCTTCCAGTGTCTCATGACCAAGATCCTGGAGCCCTTCGCGACCAAGAACCCCGGAGATCGGTGATCTACCA  
 CATGGACGACCTGTACGTGGCTCCGACCTGGAGATCGGGCAGACCCGCGCAAGATCGAGAGGAGCTGGCGGAGCACCTGCTCGCTGGGGCTTCTCCACCC  
 CCGACAAGAAGCACAGAGGAGCCCCCTTCTGTGGATGGGTACGAGTGCACCCGCAAGTGGACCGTGCAGCCCATCCAGGTGAAGCAGCTGTGCAAGCTGTGG  
 TCCTGGACCGTGAACGACATCCAGAAGCTGGTGGCAAGTGAAGTGGGCTCCAGATCTACCCCGGCATCAAGGTGAAGCAGCTGTGCAAGCTGTGG  
 CGCGCCAAGGCCCTGACCGACATCGTGGCCCCTGACCAAGGAGGAGGAGGAGGAGTGGAGTGGCGGAGAACCGCGGAGATCCTGAAGGAGCCCGCTGCAAGCGCCT  
 ACTACGACCCCTCAAGGACCTGATCGCCGAGATCCAGAAGCAGGCGCAGGCGCAGTGCAGGCGCGTGCAGAAAGATCGCCATGGAGTGCATCTGTGATCTGGGCA  
 GGCAAGTACGCCAAGACCCGCTCCGCCACACCAACGACGTGCGCCAGTGCAGGCGCGTGCAGAAAGATCGCCATGGAGTGCATCTGTGATCTGGGCA  
 GACCCCAAGTTCGGCTGCCATCCAGAAGGAGACCTGGGACACCTGTGGACCGAGTACTGGCAGGCCACCTGGATCCCCAGTGGGAGTTCGTGAACA  
 CCCCCCTGGTGAAGCTGTGGTACCACTGAGACCGGCGCCGAGAGGAGTCCAGTACGCCATCGGCATCATCCAGGCCAGCCGACCGCTCCGAGTCCGACCTGGCCCT  
 GCAGGACTCCGGCTCCGAGGTGAACATCGTGACCGACTCCAGTACGCCATCGGCATCATCCAGGCCAGCCGACCGCTCCGAGTCCGACCTGGTGAACC  
 AGATCATCGAGCAGTATCCAGAAGGACAAGTGTACCTGTCTTGGTGGCGCCCAAGGGCATCCAGGCCAGCCGACCGCTCCGAGTCCGACCTGGTGTCC  
 AACGGCATCCGCAAGTGTCTTCTGGAGGGCATCGACAAGGCCAGGAGGAGCAGAGAAGTACCAACAACCTGGCGGCGCATGGCCATGGCCCTCCGACTTCAA  
 CCTGCCCCCGCTGGTGGCCAAAGGAGATCGTGGCTCCTGCAACAAGTGCCAGCTGAAGGGCAGGCCATGCACGGCCAGGTGGACTGCTCCCCCGGCATCT  
 GGCAGCTGGACTGCACCCACCTGGAGGGCAAGATCATCTGTGGTGGCGTGCAGTGGCTCCGGCTACATCGAGGCCGAGGTGATCCCGCCGAGACCGGGC  
 CAGGAGACCGCTACTTCACTTCACTGAGCTGGCGCGCGCTGGCCATCCACACCGACACCGGCCCAACTTCACCTCCGCGCGCGCTGAAGGC  
 CGCTGTGTGGGCGGACATCCAGCAGGAGTTCGGCATCCCTACAAACCCAGTCCAGGGCGTGGTGGAGTCCATGAACAAGGAGCTGAAGAATCA  
 TCGGCCAGGTGGCGGACCGCGGAGCACCTGAAGACCGCGCTGCAGATGGCGGTGTTCATCCACAACCTCAAGCGCAAGGGCGGCATCGCGGGCTACTCC  
 GCGCGGAGGCGATCATCGACATCATCGCTCCGACATCCAGACCAAGGAGCTGCAGAAGCAGATCAACAAGATCCAGAACTTCCGCGTGTACTACCGGA  
 CTCCCGGACCCCATCTGGAAGGGCCCCGCAAGCTGTGTGGAAGGGCGGCGCGTGGTGTATCCAGGACAACCTCCGACATCAAGGTGGTGGTCCCCCGCC  
 GCAAGGCCAAGATCATCCGCGACTACGGCAAGCAGATGGCGGCGGACGACTGCGTGGCGCGCGCCGCGCAGGACGAGGACTAA

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## Fig. 122B

2003\_con\_06\_cpx pol.1.OPT

TTCTTCGCGAGAACCTGGCCTTCAGCAGGGCGCGGAGTTCTCTCCGAGCAGGCCCGGCGCAACTCCCCACCCGCGGAGCTGCGCGTGCG  
CCGCGCGACTCCCCCTGCCGAGGCCCGCGGAGGGCCAGGGCGCCATCTCCCTGTCTTCCCCAGATCACCTGTGGCAGCGCCCCCTGGTGACCG  
TGCGCATCGGCGGCCAGCTGATCGAGGCCCTGCTGGACACCGGGCCGACGACACCGTGTGGAGGACATCAACTGCCCCGCAAGTGGAAGCCCAAGATG  
ATCGCGGCATCGGCGGCTTCATCAAGGTGGCGGCTACGACACAGATCTCTGATCGAGATCTGCGGCAAGAGGCCATCGGCACCGTGTGGTGGGCCCCAC  
CCCCGTGAACATCATCGGCGCAACATGTCACCCAGATCGGCTGCAACCTGAACCTTCCCCATCTCCCCATCGAGACCGTGCCTGAACTGAAGCCCCG  
GCATGGACGGCCCCAAGTGAAGCAGTGGCCCCCTGACCGAGGAGAGATCAAGGCCCTGACCGGATCTGACCCGAGATGACCCGAGTGGAGAGGAGGCAAGATCTCC  
AAGATCGGCCCCGAGAACCCCTACAACACCCCATCTTGGCCATCAAGAGAGAGGACTCCACCAAGTGGCGCAAGCTGGTGAGCTTCCGCGAGCTGAACAA  
GGCACCCAGGACTTCTGGAGGTGCAGCTGGGCTATCCCCACCCCGCGGCTGAAGAGAGAGTCCGTGACCTGCTGGACGTGGCGGACCGCTACT  
TCTCCGTGCCCCTGACGAGACTTCCGCAAGTACACCGCTTCAACATCCCCCTCATCAACACGAGACCCCCGGCATCCGCTACCACTAACACGTGCTG  
CCCCAGGGCTGGAAGGGCTCCCCCGCATCTTCCAGTCTCCATGATCAAGATCTTGGAGCCCTTCCGATCAAGAACCCCGAGATCGTGATCTACCACTA  
CATGACGACCTGTACGTGGGCTCCGACCTGGAGATCGGCCAGCACCGCGCAAGATCGAGGAGCTGGCGGAGCACCTGTGAAGTGGGCTTCACCAACC  
CCGACAAGAACCCAGAGGAGCCCCCTTCTGTGGATGGGTACGAGCTGACCCCGACAAAGTGGACCGTGCAGCCCATCCAGCTGCCCGACAAGGAC  
TCTTGGACCGTGAACGACATCCAGAGCTGGTGGCAAGCTGAACCTGGGCTCCAGATCTACCCCGCATCAAGTGAAGCAGCTGTCAAGTGTCTGCG  
CGCGCCCAAGGCCCTGACCGACATCGTGCCCCCTGACCCCGGAGGCCGAGCTGGAGCTGGCCGAGAACCGCGAGATCTCTGAAGGAGCCCGTGCACGGCGTGT  
ACTACGACCCCTTCAAGGACCTGATCGCCGAGATCCAGAGCAGGCGCAGGCGCAGTGGACCTACAGATCTACCAAGAGCCCCCAAGAACCTGAAGACC  
GGCAAGTACGCCCGCATCAAGTCCGCCACACCAAGACGTGAAGCAGCTGACCGAGCCGCTGAGAGAGTCCAGAGATCGCCCTGGAGTCCATCGTGATCTGGGGCAA  
GACCCCAAGTTCGGCTGCCATCCAGAAAGACCTGGGAGACCTGGTGGACCGAGTACTGGCAGGCCACTTGGATCCCCGAGTGGGAGTTCGTGAACA  
CCCCCCCCCTGGTGAAGCTGTGGTACAGTGGAGCCGACCTGTGGGCGCCGAGACCTTCTAGTGGACGGCGCCGCAACCGCGAGACCAAGAAAG  
GGCAAGCGCGGTACGTGACCGACCGCGGCGCCAGAGGTGGTGTCCCTGACCGAGACCAACAGAGACCGAGCTGCAGGCCATCAACCTGGCCCT  
GCAGGACTCCGGCTCCGAGGTGAACATCGTGACCGACTCCAGTACGCCCTGGGCATCATCCAGGCCAGCCCCGACAACTCCGAGTCCGAGTGGTGAACC  
AGATCATCGAGCAGCTGATCAAGAGGAGAGGTGTACCTGTCTGGGTGCCGCCACAAGGGCATCGGCGGCAACGAGCAGGTGGACAAGCTGGTGTCC  
ACCGGCATCCGCAAGGTGTGTCTTGGACGGCATCGACAAGGCCCGCAGGAGGACACGAGCGCTACCACTCCAACTGGCGCGCCATGGCCTCCGACTTCAA  
CCTGCCCCCATCGTGGCCAAGGAGATCGTGGCTCTCTGCGACAAGTGCAGCTGAAGGGGAGGCCATGCACGGCCAGGTGGACTGCTCCCCCGGCATCT  
GGCAGTGGACTGACCCCACTGGAGGGCAAGATCATCTGTGTGGCCGTGCAGTGGCTCCGGCTACATCGAGGCCGAGGTGATCCCCCGCGAGACCGGC  
CAGGAGACCGCTACTTCTCTGAAGCTGGCCGCGCTGGCCCGTGAAGGTGATCCACACCGACAAAGGCTCCAACTTCACCTCCGCGCGCTGAAGGC  
CGCCTGTGTGGGCCAACATCACCCAGGAGTTCGGCATCCCCCTACAACCCCGCTCCAGGGCGTGGTGGAGTCCATGAACAAGAGCTGAAGAAGATCA  
TCGSCCAGGTGGCGACCGAGGACCTGAAGACCGCCGTGCAGATGGCCGTGTTCATCCACAACCTCAAGCGCAAGGGCGGCATCGGCGGCTACTCC  
GCCGCGAGCGCATCATCGACATCATCGCCTCCGACATCCAGACCAAGGAGCTGCAGAGCAGATCACCAAGATCCAGAACTTCGCGGTGTACTACCGGA  
CTCCCGGACCCCCATCTGGAAGGGCCCCGCAAGCTGTGTGGAAAGGGCGAGGGCGCGCTGTGTGATCCAGGACAACTCCGAGATCAAGGTGGTGGCCCCGCG  
GCAAGGCCAAGATCATCCGCGACTACGGCAAGCAGATGGCCGCGGACGACTGCGTGGCCGCGCCAGGACGAGGACTAA

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Fig. 123A

80.. 2003 CON 08 BC pol. PEP

FFREILAFQGEAREFPPEQTRANSPTSRELOVRGDNPSSEAGTERQGTILNFQITLWQRPVLSIKVGGQKEALLDTGADDTVLEEVNLP  
 KWPKMIGGIGGFIKVRQYEIPIECGKKAIGTVLGPFPVNIIGRNMLTQLGCTLNFPISPIETVPVKLPGMDGPKVKQWPLTEEEKIKA  
 LTAICDEMEKEGKITKIGENDPNTPIFAIRKKDSSKWRKLVDFRELNKRTQDEWEVQLGIPHAGLKKKSVTVLDVGDAYFSVPLDKDER  
 KYTAFTIPSVNNETPGIRYQYNVLPQGWKSPAFQCSMTKILEPFRKQNPDIIVIQYMDLVGSDLEIGQHRTKIEELREHLLKWGFTTP  
 DKKHQKEPPFLWMGYELHPDKWTVQPIQLPEKDSWTVNDIQKLVGKLNWASQIYPGIKVRQLCKLLRGAKALTDIVPLTEEALELEAENREI  
 LKEPVHGAYYDPSKELIAEIQKQGDQWTYQIYQEPFKNLKTGKYAKMRTAHTNDVKQLTEAVQKIAMESIVIWGKIPKFRLPPIQKETWETW  
 WTDYQWATWIPWEFVNTPLVLKWLWYQLEKDPPIAGVETFFYVDGAANRETKIGKAGYVTDGRKKIVSLTDTTNQKTELQAIYIALQDSGSEV  
 NIVTDSQYALGIIQAQPDKSESELVNQIIEQLIKKERVYLSWVPAHKGIGGNEQVDKLVNSGIRKVLFLDGDIDKAQEEHEKYHSNWRAMASD  
 FNLPPIVAKEIVASCDQCQLKGEAMHGQVDCSPGIWQLDCTHLEKIIIVAVHVASGYIEAEVIPAETGQETAYFILKLAGRWPVKVIHTDN  
 GSNFTSAAVKAACWWAGIQQEFFGIPYNPQSQGVESMNKELKKLIGQVRDQAEHLKTAVMQMAVFIHNFRRKGGIGGYSAGERIVDIIATDIO  
 TRELQKQIIKIQNFVYYRDSRDPWKGPAKLLWKGEAVVIQDNSDIKVVPRRKAKIIKDYGKQMGADCVAGRQDED\$

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Fig. 124A

81.. 2003 CON 10 CD pol. PEP

FFRENLAFOQRKARELPSEQTRANSPTSRELVRVWGGDNTLSETGAERQGAVSLSFPQITLWQRPVTVVKIGGQKKEALLDTGADDTVLEEMN  
 LPGKWKPMIGGIGGFIKVRQYDQIILIEICGYKAIGTVLGPFPVNIIGRNLLTQIGCTLNFPISPIETVPVKLPGMDGPKVKQWPLTEEK  
 IKALTEICTEMEKEGKISRIGPENPYNTPIFAIRKKDSTKWRKLVDFRELNKRTQDEWEVQLGIPHAGLKKKSVTVLDVGDAYFSVPLYE  
 DFRKYTAFTIPINNNETPGIRYQYNVLPQGWKSPAFQSSMTKILEPFRKQNPDIIVIQYMDLVGSDLEIGQHRKIEELRGHLLKWGF  
 TTPDKKHQKEPPFLWMGYELHPDKWTVQPIQLPEKDSWTVNDIQKLVGKLNWASQIYPGIKVRQLCKLLRGAKALTDIVPLTEEALELEAEN  
 REILKEPVHGVYYPDSKDLIAEIQKQGDQWTYQIYQEPHKNLKTGKYAKRRTAHTNDVKQLTEAVQKIAQESIVIWGKTPKFRLPPIQKETW  
 ETWWTDYWQATWIPWEFVNTPLVLKWLWYQLEKEPIVGAETFYVDGAANRETKLGKAGYVTDGRQKVISITDTTNQKTELQAINLALQDSG  
 SEVNIVTDSQYALGIIQAQPDKSESELVNQIIEQLIKKEKVLVSWVPAHKGIGGNEQVDKLVSSGIRKVLFLDGDIDKAQEEHEKYHNNWRAM  
 ASDFNLPVVAKEIVASCDKCQLKGEALHGQVDCSPGIWQLDCTHLEKVLVAVHVASGYIEAEVIPAETGQETAYFILKLAGRWPVKVH  
 TDNGSNFTSAAVKAACWWAGIKQEFFGIPYNPQSQGVESMNKELKIIIGQVRDQAEHLKTAVMQMAVFIHNFRRKGGIGGYSAGERIIDIAT  
 DIQTKELQKQIIKIQNFVYYRDSRDPWKGPAKLLWKGEAVVIQDNSDIKVVPRRKVKIKDYGKQMGADCVASRQDEDQ





## Fig. 124B

2003\_con\_10\_cd pol. opt

TTCTTCCGCGAAGAACTGGCCCTTCCAGCAGGCAAGGCCCGGAGCTGCCCTCCGAGCAGACCCCGGCCCACTCCCCCACCTCCCCGGAGCTGCCGGTGTG  
 GGGCGCGACAAACACCCCTGTCCGAGACCGGCGCCGAGCGCCAGGGCGCCGTGTCCCTGTCTTCCCCAGATCACCCCTGTGGCAGCGCCCTTGGTGACCG  
 TGAGATCGGGCGCCAGCTGAAGAGGCCCTGTGGACACCGGGCCGACACACCGTCTGGAGGAGTGAACCTGCCCGGCAAGTGAAGCCCAAGATG  
 ATCGCGGCATCGCGGCTTATCAAGGTGGCCAGTACGACAGATCCTGATCGAGATCTGGGTACAAAGGCCATCGGCACCGTGTGGTGGCCCCAC  
 CCCCCTGAACATCATCGGCCGCAACCTGTGTGACCCAGATCGGTGACCCCTGAACCTTCCCATCTCCCATCGAGACCGTGTGAAGCTGAAGCCCCG  
 GCATGACGGCCCCAAGGTGAAGCAGTGGCCCCCTGACCGAGGAGAAAGATCAAGGCCCTGACCGAGATCTGACCGAGATGGAGAGGAGGCAAGATCTCC.  
 CGCATCGGGCCCCGAGAACCCCTACAAACACCCCATCTTCGCCATCAAGAAGAGACTCCACCAAGTGGCGCAAGCTGGTGGACTTCCCGAGCTGAACAA  
 GCGACCCAGGACTTCTGGAGGTGACGTGGGCATCCCCACCCCGCCCTGAAGAAGAAAGTCCGTGACCGTGTGGACGTGGCGACGCCCTACT  
 TCTCCGTGCCCTGTACGAGGACTTCCGCAAGTACACCGCCTTACCATCCCTCCATCAACAAGACCCCGGCATCCGTACCACTAACCGTGTG  
 CCCCAGGGCTGAAGGGCTCCCCGCTTCCAGTCTCCATGACCAAGATCCTGGAGCCCTTCCGCAAGCAGAACCCCGAGATGGTGTATCTACCAATA  
 CATGGACGACCTGTACGTGGCTCCGACCTGGAGATCGGCCAGCACCGCATCAAGATCGAGGAGCTGGCGGCCACCTGCTGAAGTGGGCTTCAACCAACC  
 CCGACAAAGACACAGAGGAGCCCCCTTCTGTGGATGGGTACGAGCTGCACCCGACAAAGTGGACCGTGCAGCCCATCCAGTCCCCGAGAAGGAC  
 TCCTGGACCGTGAACGACATCCAGAAGCTGGTGGCAAGCTGAACCTGGCCCTCCAGATCTACCCCGGCATCAAGGTGGCCAGCTGTCAAGCTGTCTGG  
 CCGCGCCAAAGCCCTGACCGACATCGTGGCCCTGACCGAGAGGCCGAGCTGGAGCTGGCCGAGAACCGCGAGATCTTGAAGGAGCCCGTGCACGGCGTGT  
 ACTACGACCCCTCAAGGACCTGATCGCCGAGATCCAGAAGCAGGGCCAGGACCACTGGACCTTACCAGATCTACAGGAGCCCAAGAACCTGAAGACC  
 GGCAAGTACGCGCAAGCGCCGACCGCCACCAACGACGTGAAGCAGCTGACCGAGGCCGTGCAAGAGATCGCCCAAGGATCCATCGTGTCTGGGCA  
 GACCCCAAGTTCGGCTGCCCATCCAGAAGGAGACCTGGGAGACCTGGTGGACCGACTACTGGCAGGCCACCTGGATCCCCGAGTGGGAGTCTGTGAACA  
 CCCCCCCTGGTGAAGCTGTGTACCAAGCTGGAGAGGAGCCCATCGTGGCGCCGAGACCTTCTACGTGGACGGCGCCCAACCGCGAGACCAAGCTG  
 GGCAAGCGCGCTACGTGACCGACCGCGCGCCGAGAGGTGATCTCCATCACCGACACCAACCAAGAGACCGAGCTGCAGGCCATCAACCTGGCCCT  
 GCAGGACTCCGGCTCCGAGGTGAACATCGTGACCGACTCCAGTACGCCCTGGGCATCATCCAGGCCAGCCCCGACAAAGTCCGAGTCCGAGTGTGAACC  
 AGATCATCGAGCAGCTGATCAAGAAGGAGAGGTGTACCTGTCTGGGTGCCGCCACAAGGCCATCGCGGCAACGAGCAGGTGGACAAAGCTGGTGTCC  
 TCCGGCATCCGCAAGGTGCTGTCTCTGGACGGCATCGACAAGGCCAGGAGGAGACGAGAGAGTACCACAACAACTGGCGGCCATGGCTCCGACTTCAA  
 CCTGCCCCCGTGGTGGCCAAAGAGATCGTGGCCCTCTGCGACAAGTGCCAGCTGAAGGGCGAGGCCCTGCACGGCCAGGTGGACTGCTCCCCCGGCATCT  
 GGAGCTGGACTGCACCCACCTGGAGGGCAAGGTGATCTGTGTGGCCGTGCACGTGGCTCCGGTACATCGAGGCCGAGGTGATCCCCCGCGAGACCGGC  
 CAGGAGACCGCTACTTCTGTGAGCTGGCCGCGCTGGCCCGTGAAGGTGGTGCACACCGCAACGGCTCCAACCTCACCTCCGCGCCGTGAAGGC  
 CGCTGTGTGGTGGCCGCGCATCAAGCAGGAGTTCGGCATCCCCACACCCCACTCCAGGGCGTGGTGGAGTCCATGAACAAGGAGCTGAAGAAGATCA  
 TCGGCCAGGTGCGGACCAAGCCAGCACTGAAGACCGCCGTGCAGATGGCCGTGTCTATCCACAACCTTCAAGCGCAAGGGCGGCATCGCGGCTACTCC  
 GCCGCGAGCGCATCATCGACATCATCGCCACCGACATCCAGACCAAGGAGCTGCAGAAGCAGATCATCAAGATCCAGAACCTTCCGCTGTACTACCGGA  
 CTCCCCGACCCCATCTGAAGGGCCCCGCAAGCTGTGTGAAGGGCGAGGGCGCGGTGGTGTATCCAGGACAACTCCGACATCAAGGTGGTGGCCCCGCC  
 GCAAGGTGAAGATCATCAAGGACTACGGCAAGCAGATGGCCGCGCGGACTGCGTGGCCCTCCCGCCAGGACGAGGACCCAG

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Fig. 125A

## 82. 2003 CON 11 CPX pol. PEP

FFRENLAFOQGEAREFSEQARANSPTSRELVRGGDSPLPETGAEGEGAISFNFPQITLWQRPLVTIKVAGQLKEALLDTGADDTVLEEID  
 LPRWKPKMIGGIGGFIKVRQYEEIIIEIGKKAIGTVLGPPTPVNIIGRNMLTQIGCTLNFPISPIDTVPVKLPGMDGPKVKQWPLTEEK  
 IKALTEICTEMEKEGKISKIGPENPYNTPVFAIKKDKSTKWRKLVDFRELNRKTQDFWEVQIGIPHPAGLKKKSVTVLDVGDAYFVSPLDE  
 SFRKYTAFTIPSINNETPGIRYQYNVLPQGWKGSPIFQSSMTKILEPFTQNPETVIYQYMDLLYVGSDDLEIGQHREKVEELRKHLLKWGF  
 TTPDKKHQKEPPFLWMGYELHPDKWTVQPIQLPDKECWTVNDIOKLVGKLNWASQIYPGKVKQLCKLLRGTKALTDIVPLTAAEAELELAEN  
 REILKEPVHGVYDPSKDLIAEVQKQGLDQWTYQIYQEPFKNLKTGKYAKRRTAHTNDVRQLAEVVQKISMESIVINGKIPKFERLP IQRETW  
 ETWWTDYWOATWIPWEFEVNTPLVLKWLQLEKEPIIGAETFYVDGAANRETCLKGAGYVDKGRQKVVTLTETTNQKTELEAHLALQDSG  
 LEVNIIVTDSQYALGIIQAOPDKSESELVSQIIIEQLIKKEKVYLSWVPAHKGIGGNEQVDKLVSSGIRKVLFLDGDIDKAEHEHYHNSWRAM  
 ASDFNLPPIVAKELIVASCDKQCLKGEAMHGQVDCSPGIWQLDCTHLEGKIILVAVHVASGYIEAEVIPAETGOETAYFILKLAGRWPVKVIH  
 TDNGSNFTSAAVKAACWWANIQQEFGIPYNPQSQGVVESMNKELKKIIGQVREQAEHLKTAVQMAVFIHNEKRGKGGIGGYSAGERIIVDIAT  
 DLQTKELQKQITKIQNERVYRDSRDPINWGPAPKLLWKGEAGAVVIQDNSDIKVVPRRKAKIIRDYGKQMGAGDDCVAGRQDED\$

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Fig. 126A

## 83. 2003 CON 12 BF pol. PEP

FFRENLAFOQGEAREFSEQARANSPPASRELWVRRGDNPLSEAGAERRGTVPSSLSEFPQITLWQRPLVTIKVGGQLKEALLDTGADDTVLEDI  
 NLPKWKPKMIGGIGGFIKVRQYDNILIEICGHKAIGTVLGPPTPVNIIGRNMLTQIGCTLNFPISPIDTVPVKLPGMDGPKVKQWPLTEE  
 KIKALTEICTEMEKEGKISKIGPENPYNTPVFAIKKDKSTKWRKLVDFRELNRKTQDFWEVQIGIPHPAGLKKKSVTVLDVGDAYFVSPLD  
 KDERKYTAFTIPSVNNETPGIRYQYNVLPQGWKGSPIFQSSMTKILEPFRKQNPDIYIYQYMDLLYVGSDDLEIGQHRTKIEELRQHLLRWG  
 FTTTPDKKHQKEPPFLWMGYELHPDKWTVQPIVLPEKDSWTVNDIOKLVGKLNWASQIYPGKVKQLCKLLRGTKALTEVPLTKEAELELAEN  
 NREILKEPVHGVYDPSKDLIAEQKQGGQWTVYQIYQEPFKNLKTGKYARMRGAHTNDVKQLTEAVQKITTESIVINGKTPKFERLPILKET  
 WDTWWTYWOATWIPWEFEVNTPLVLKWLQLETEPIAGAETFYVDGASNRETCKKGAGYVTDGRQKAVSLTETTNQKAEHLAIQLALQDS  
 GSEVNIIVTDSQYALGIIQAOPDKSESELVNIIEQLIKKEKVYLSWVPAHKGIGGNEQVDKLVSAIRKILFLDGDIDKAEHEHYHNNWRA  
 MASDFNLPPVAKELIVASCDKQCLKGEAMHGQVDCSPGIWQLDCTHLEGKIILVAVHVASGYIEAEVIPAETGOETAYFILKLAGRWPVKTI  
 HTDNGPNFSSAAVKAACWWAGIQQEFGIPYNPQSQGVVESMNKELKKIIRQVRDQAEHLKTAVQMAVFIHNEKRGKGGIGGYSAGERIIDIIS  
 TDIQTRELQKQIIKIQNERVYRDSRDPVWKGPAKLLWKGEAGAVVIQDNSEIKVVPRRKAKIIRDYGKQMGAGDDCVAGRQDED\$

## Fig. 125B

2003\_con\_11\_cpx pol. OPT

TTCTTCGGGAGAACTGGCCCTTCAGCAGGGCGAGGCCCGCGAGTTCTCCCCGAGCAGGCCCGCGCAACTCCCCCACCCTCCCGCAGCTGCGCGTGCG  
 CGCGGGGACTCCCCCTGCCGAGACCGGGCGAGGGCGGCCATCTCTCAACTTCCCCAGATCACCTGTGGCAGCGCCCCCTGGTGACCA  
 TCAGGTGGCGGCCAGCTGAAGAGGCCCTGTGGACACCGGGCGCGACACCGTGTGGAGAGATCGACCTGCCCGGCCGTGGAAGCCCAAGATG  
 ATCGGGGCGCATCGCGGCTTCATCAAGGTGGCGAGTACGAGAGATCATCATGAGATCGAGGGCAAGAGGCCATCGGCACCGTGTGGTGGCCCCAC  
 CCGGTGAACATCATCGGGCGCAACATGTCACCGAGATCGGTGCACCTGAACCTCCCCATCTCCCCATCGACACCGTGCCTGAAGCTGAAGCTGAAGCCCG  
 GCATGGACGGCCCCAAGGTGAAGCAGTGGCCCCCTGACCGAGGAGAAGATCAAGCCCTGACCGGATCGACCGAGATGAGAGGAGGCAAGATCTCC  
 AAGATCGGGCCCCGAGAACCCCTACAACACCCCGTGTTCGCCATCAAGAAGAGACTCCACCAAGTGGCGCAAGCTGGTGGACTTCCGGGAGCTGAACAA  
 GCGCACCCAGGACTTCTGGGAGGTGCAGCTGGGATCCCCCAACCCCGCGGCTGAAGAAGAAAGTCCGTGACCCGTGTGGACGTGGCGGACGCTACT  
 TCTCCGTGCCCCCTGGACGAGTCTTCCGCAAGTACACCGCTTACCATCCCCCTCCATCAACAACGAGACCCCCCGGCATCCGCTACCACTACAACGCTGCTG  
 CCCCAGGGCTGGAAGGCTCCCCCGCATCTTCCAGTCTCCATGACCAAGATCTTGAGCCCTTCCGACCCAGAACCCCGAGATCGTGATCTACCACTA  
 CATGGACGACCTGTACGTGGCTCCGACCTGGAGATCGGCCAGCACCGCGAGAAGTGGAGGAGCTGGCAAGCACCTGTGAAGTGGGCTTCAACACCC  
 CCGACAAGAAGCACCAAGAGGCCCTTCTGTGGATGGGTACGAGCTGCACCCGACAAGTGGACCGTGCAGCCCATCCAGTGCCTCCGACAAGGAG  
 TGCTGGACCGTGAACGACATCCAGAAGCTGGTGGCAAGCTGAAGTGGGCTCCAGATCTACCCGCGCATCAAGGTGAAGCAGCTGTGCAAGCTGCTGGC  
 CGGACCAAGGCCCTGACCGACATCGTGGCTGACCGCGGAGGCCGAGCTGGAGTGGCCGAGAACCGCGAGATCTCTGAAGAGCCCGTGCACGGCGTGT  
 ACTACGACCCCTCCAAGGACCTGATCGCCGAGTGCAGAAAGCAGGCCCTGGACCACTGACCACTTACAGAGAGCCCTTCAAGAACCTGAAGACC  
 GGCAGTACGCGCAAGCGCCGACCGCCACACCAACGAGCTGGCCAGCTGGCGAGGTGGTGCAGAAAGTCTCCATGGAGTCCATCGTGATCTGGGCA  
 GATCCCCAAGTTCGGCTGCCATCCAGCGGAGACCTGGGAGACCTGGTGACCGACTACTGGCAGGCCACCTGGATCCCCGAGTGGAGTTCGTGAACA  
 CCCCCCTGGTGAAGCTGTGGTACAGCTGGAGAAGAGCCCCATCATCGGGCGCGAGACCTTCTACGTGGACGGCGCGCCCAACCGCGAGACCAAGCTG  
 GGCAAGCGCGCTACGTGACCGCAAGGGCGCGAAGGTGGTGACCTGACCGAGACCCACCAACAGAGACCGAGTGGAGGCCATCCACCTGGCCCT  
 GCAGGACTCCGGCTGGAGTGAACATCGTGACCGACTCCAGTAGCCCTGGGCATCATCCAGGCCAGCCCGACAAGTCCGAGTCCGAGCTGGTGTCCC  
 AGATCATCGAGCAGCTGATCAAGAAGAGAGTGTACTCTCTGGTGCCGCCCAAGGGCATCGGGCGCAACGAGCAGGTGGACAAGTGGTGTCC  
 TCCGGCATCCGCAAGGTGTCTCTGGACGGCATCGACAAGGCCAGGAGGACGAGCGCTACCACTCAACTGGCGGCCATGGCCTCCGACTTCAA  
 CCTGCCCCCATCGTGGCCAAAGGAGATCGTGGCTCTCGGACAAAGTGCCAGCTGAAGGGCGAGGCCATGCACGGCCAGGTGGACTGTCCCCCGGCATCT  
 GGCAGCTGACTGCACCCACTGGAGGGCAAGATCATCTGTGGCGGTGCAGTGGCTCCGGCTACATCGAGGCCCGAGGTGATCCCCCGCGAGACCGGC  
 CAGGAGACCGCTACTTCTATCTGAAGCTGGCGCGCGTGGCCGTGAAGTGTATCCACACGACAAACGGCTCCAACTTCACTCCGCCCGCTGAAGC  
 CGCTGTGTGGGCCAACATCCAGCAGGAGTTCGGCATCCCCATACACCCCGAGTCCAGGGCGTGGTGGAGTCCATGAACAAGGAGTGAAGAAGATCA  
 TCGGCCAGGTGGCGAGCAGCGGAGCACCTGAAGACCGCGCTGCAGATGGCGTGTTCATCCACAACCTTCAAGCGCAAGGGCGGCATCGGGGCTACTCC  
 GCCGGCAGCGCATCGTGGACATCATCGCCACCGACCTGCAGACCAAGGAGCTGCAGAAGCAGATCACCAAGATCCAGAACTTCCGCGTGTACTACCGGA  
 CTCCCGGACCCCATCTGGAAGGGCCCCGCAAGCTGTGTGGAAGGGCGAGGGCGCGTGGTGTATCCAGGACAACTCCGACATCAAGGTGGTGTCCCCGCC  
 GCAAGGCCAAGATCATCCGCGACTACGGCAAGCAGATGGCCGCGGACGACTCGTGGCGCGCGCGCAGGACGAGACTAA

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## Fig. 126B

2003\_con\_12\_BF\_pol.1.OPT

TTCTTCGGCGAGAACCTGGCCCTTCCAGCAGGGCGAGGCCCGCAAGTTCCCTCCAGCAGGCCCGCGCCAACTCCCCCGCTCCCGCAGCTGTGGTGCG  
CCGGCGGACAAACCCCTGTCCGAGGCGGCGGAGCGCGGCAACCGTGCCCTCCCTGTCTTCCCTCCAGATCACCTGTGGCAGCGCCCCCTGGTGA  
CCATCAAGGTGGCGGCCAGCTGAAGGAGGCCCTGCTGGACACCGGCGCGACACACCGTGTGGAGGACATCAACCTGCCGCAAGTGAAGCCCAAG  
ATGATCGGCGGCATCGGCGGCTTCATCAAGGTGAAGCAGTACGACAACATCCTGATCGAGATCTGGGGCCACAAGGCCATCGGCACCGTGTGGTGGGCC  
CACCCCGTGAACATCATCGGCGCAACCTGTGACCCAGTGGCTGCACCTGAATTCCTCCATCTCCCCATCGAGACCGTGCCTGAAGCTGAAGC  
CCGGCATGGACGGCCCCAAGGTGAAGCAGTGGCCCCCTGACCGAGGAGAGATCAAGGCCCTGACCGAGATCTGCACCGAGATGGAGAGGGCAAGATC  
TCCAAGATCGGCCCCGAGAACCCCTACAACACCCCGTGTTCGCCATCAAGAAGAGTCCACCAAGTGGCGCAAGCTGGTGGACTTCGCGGAGCTGAA  
CAAGCGCACCCAGGACTTCTGGGAGGTGAGCTGGGCATCCCCACCCCGCGCTGAAGAAGAAAGTCCGTGACCGTGTGGACGTGGCGGACGCCT  
ACTTCTCCGTGCCCTGGACAAGGACTTCCGCAAGTACACCGCTTCAACATCCCTCCGTGAACAACGAGACCCCCCGCATCCGCTACAGTACAAAGTG  
CTGCCCCAGGGCTGGAAGGCTCCCCCGCATCTTCCAGTCTCATGACCAAGATCCTGGAGCCCTTCCGCAAGCAGAACCCCGACATCGTGATCTACCA  
GTACATGGACGACCTGTACGTGGCTCCGACCTGGAGATCGGCCAGCACCGCAAGATCGAGAGCTGGCCAGCACTGTGCGCTGGGCTTCACCA  
CCCCGACAAGAAGCACAGAAAGGAGGCCCTTCTGTGGATGGCTACGAGCTGCACCCCGACAAGTGGACCGTGCAGCCCATCGTGCTGCCCGAGAAG  
GACTCTGGACCGTGAACGACATCCAGAGCTGGTGGCAAGTGAATGGGCTCCAGATCTACCCCGCATCAAGGTGAAGCAGCTGTGCCGCTGCT  
GCGCGCACCAAGGCTTACCGAGTGTATCCCCCTGACCAAGAGGCGGAGCTGGAGCTGGCCGAGAACCGCGAGATCCTGAAGGAGCCCGTGCACGGCG  
TGTACTACGACCCCTCAAGGACCTGATCGCCGAGATCCAGAAGCAGGGCCAGGCCAGTGGACCTTACAGATCTACCAGAGCCCTTCAAGAACCTGAAG  
ACCGGCAAGTACGCCCGCATGCGGGCGCCACACCAACGACGTGAAGCAGCTGACCGAGGCGTGCAGAAGATCAACACCGAGTCCATCGTGATCTGGGG  
CAAGACCCCCAAGTTCGCTGAGGAGACCTGGGACACCTGGTGACCGGATCTGSCAGGCCACCTGGATCCCCGAGTGGGAGTTCGTGA  
ACACCCCCCTGTTGTAAGCTGTGTACCAAGCTGGAGACCGAGCCCATCGCCGGCGCGGAGACCTTCTACGTGGACGGCGCTCCAAACCGGAGACCAAG  
AAGGCAAGGCGGCTACGTGACCGACCGCGGCGGCCAGAGGCCGTGTCCCTGACCGAGACCAACCAAGAGGCGGAGCTGCACGCCATCCAGCTGGC  
CCTGCAGGACTCCGGCTCCGAGGTGAACATCGTGACCGACTCCAGTACGCCCTGGGCATCATCCAGGCCCGAGCCCGACAAGTCCGAGTCCGAGCTGGTGA  
ACCAATCATCGAGCAGCTGATCAAGAAGGAGAAGTGTACCTGTCTGGGTCCCCCGCCACAAGGSCATCGGCGGCAACGAGCAGGTGGACAAGCTGGTG  
TCCGCGGGCATCCGCAAGATCCTGTCTCGACCGGCATCGACAAGGCCAGGAGGACGAGAACTACCAACAACACTGGCGGCCATGGCCTCCGACTT  
CAACTGCCCCCGTGGTGCCCAAGGATCGTGGCCCTCTGCGACAAGTGCAGCTGAAGGGCGAGGCCATGCACGGCCAGGTGGACTGCTCCCCGGCA  
TCTGGCAGCTGGACTGCACCCACCTGGAGGCAAGATCATCTGTGGCCGTGCACGTGGCTCCGCTACCTGGAGGCCGAGGTGATCCCCCGCGAGACC  
GGCAGGAGACCGCTACTTCATCTGAGCTGGCCGCGCTGGCCCGTGAAGACCATCCACACCGACAACGGCCCCAACTTCTCTCCGCGCGCTGAA  
GGCCGCTGCTGGTGGCGGCATCCAGAGGATTCGGCATCCCTACAACCCCGAGTCCAGGGCGTGGTGGATCCATGAACAAGAGCTGAAGAAGA  
TCATCCGCCAGGTGGCGACACAGGCGAGCACCTGAAGACCGCGCTGCAGATGGCCGTGTTCATCCACAACCTCAAGCGCAAGGGCGCATCGGCGGTAC  
TCCGCGGCGAGCGCATCATCGACATCATCTCCACCGACATCCAGACCCCGAGCTGCAGAAGCAGATCATCAAGATCCAGAATCTCCGCGTGTACTACCG  
CGACTCCCGCGACCCCGTGTGAAGGGCCCCCAAGCTGTGTGAAGGGCGAGGGCGCGTGGTGTATCCAGGACAACTCCGAGATCAAGGTGGTGGCCCC  
GCCGCAAGGCCAAGATCATCCGCGACTAGGCCAAGCAGATGGCCCGCGACGACTGCTGGTGGCCGCGCGCAGGACGAGACTAA

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## Fig. 127A

84. 2003 CON 14 BG pol..PEP  
FFRENLAFOQGEAREFSPEQARANSPTRRRELWVRGDSPLPEARAEGKGDIPISLPQITLWQRPLVTVRIGGQLIEALLDTGADDTVLEDIN  
LPGKWKPMIGGIGGFVKVRQYDQILIEICGKKAIGTVLVGPTPINIIGRNMLTQIGCTLNFPIETVPVKLPGMDGPKVKQWPLTEEK  
IKALTDICTEMEREGKISKIGPENPYNTPIFAIAKKKDSWKRLVDRELNKRTQDFWEVQLGIPHPISGLKKKSVTVLVDVGDAYFSVPLDE  
SFRKYTAFTIPSTNNETPGIRYQYNNVLPQGWKGSPIFQSSMTKILEPFRIKNPELVIYQYMDLLYVGSDEIGQHRAKIEELRKHLLSWG  
TTPDKKHQKEPPFLMMGYELHPDKWTVQPIQLPDKESWTVNDIQKLVGKLNWASQIYPGIVKQCLLKGAKALTDIVPLTAAEAELELAEN  
REILKEPVHGVYEPKELIAEVQKQGLDQWYQIYQEPYKNLKTGKYAKRGSAHTNDVKQLTEVVQKIATESIVWGKTPKFKLPIRKETW  
EVWTEYWQATWIPDWEFVNTPPLVKLWYRLETEPIAGAEITYYVDGAANRETGLGKAGYVTDKQKQKIITLTETTNQKAELQAIHIALQDSG  
SEVNIIVTDSQYALGIIQAQPDRESEEVNQIIEQLIKKEKVLSWVPAHKGIGGNEQVDKLVSSGIRKVFELDGIDKAQEEHEKYHSNWRAM  
ASDFNLPPVVAKELIVASCDKCQLKGEAMHGQVDCSPGIWQLDCTHLEGGIILVAVHVASGYIEAEVIPAETGQETAYFILKLAGRWPVKIIH  
TDNGSNFTSAAVKAACWWANITQEFFGIPYNPQSQGVVESMNKELKKIIGQVRDQAEHLKTAVQMAVFIHNEKRKGGIGGYSAGERIIDI IAS  
DIQTKELQKQITKIQNFRVYFRDSRDPWKGPAKLWKGEGAVVIQDNNEIKVVPRRKAKIIRDYKGQMAGDDCVAGRQDED\$

## Fig. 127B

2003\_con\_14\_bg\_pol.opt

TTCTTCGGGAGAACTGGCCCTCCAGCAGGGCGAGGCCCGCGAGTTCTCCCCCGAGCAGGCCCGCGCCCAACTCCCCACCCCGCGAGCTGTGGGTGCG  
 CCGCGGCGACTCCCCCTGCCCCGAGGCCCGCGCCGAGGGCAAGGGCGACATCCCCCTGTCCCTGCCCCAGATCACCTGTGGCAGCGCCCCCTGGTGACCG  
 TCGCATCGCGGCGCAGCTGATCGAGGCCCTGCTGGACACCGCGCGCGACGACACCGTCTGGAGGACATCAACCTGCCCGCAAGTGAAGCCCAAGATG  
 ATCGCGGCATCGCGCGCTTCATCAAGTGGCCAGTACGACAGATCTGTATCGAGATCTGGGGCAAGAGGCCATCGGCACCGTGTGGTGGGCCCCAC  
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